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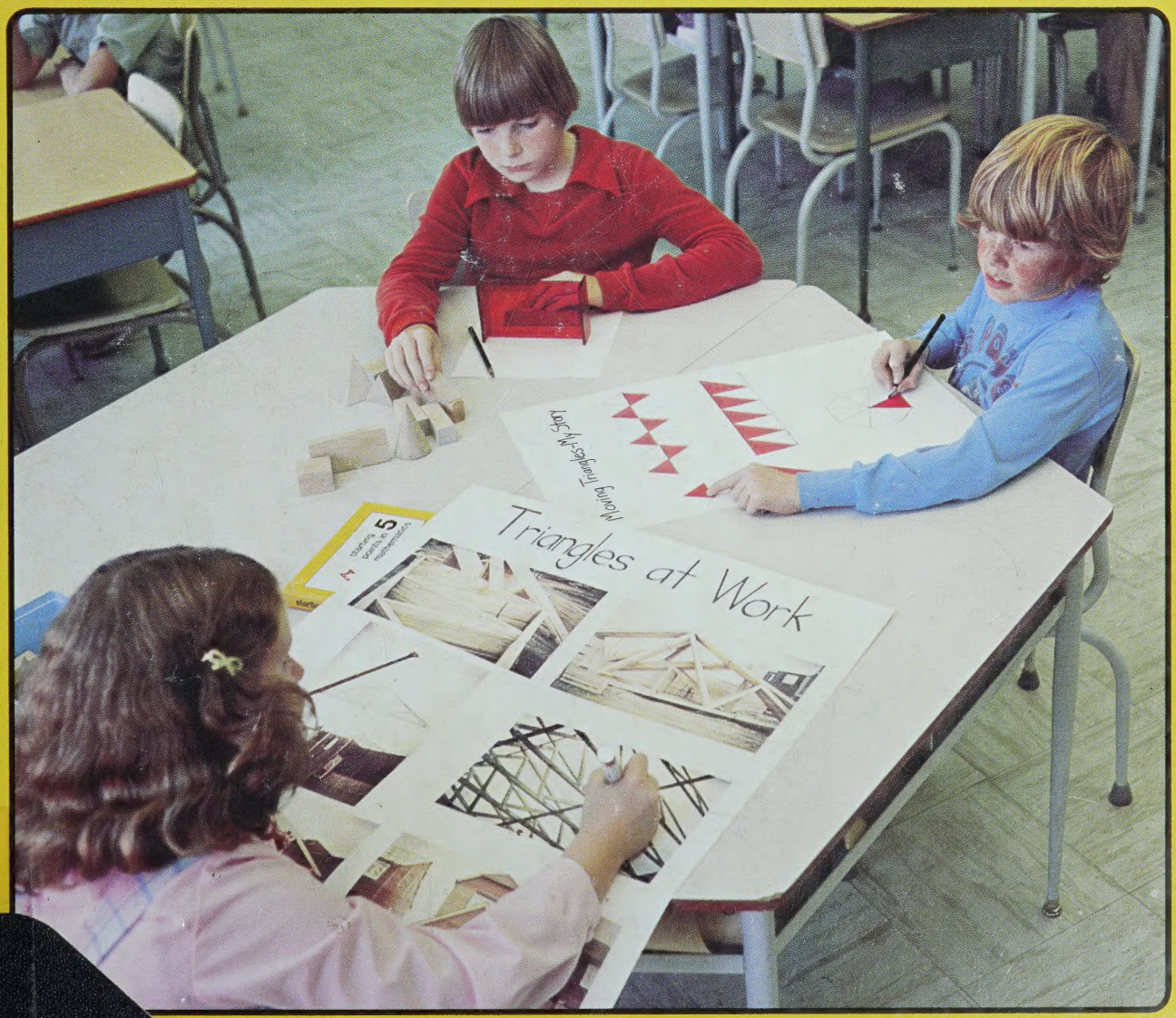

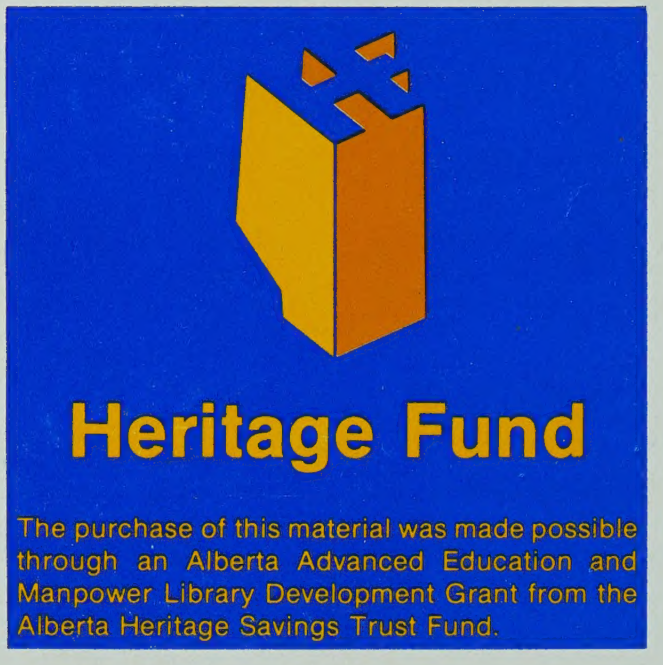

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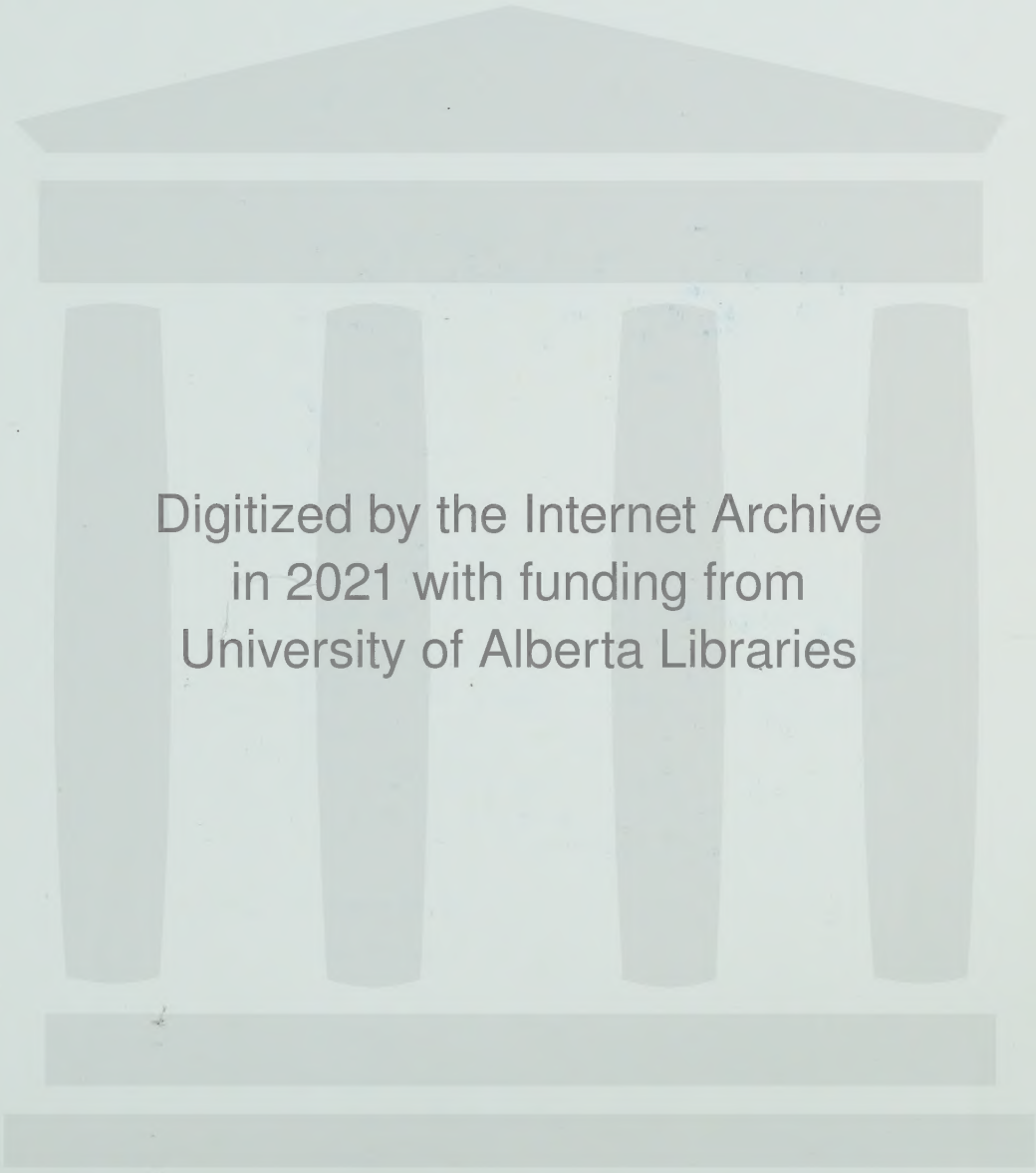
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starting points in mathematics

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Level 5

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To the Students

Most of the lessons in this book are teaching lessons. Others are for practice.

The first part of a teaching lesson shows you what is to be learned.

Working Together

The second part of a teaching lesson allows you to check your understanding step by step.

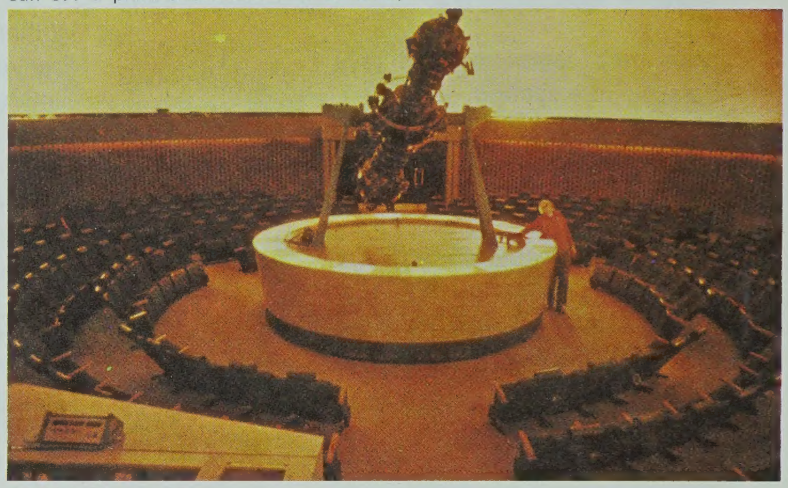
For this part, you may work together with your teacher, with each other, or you may work by yourself to check your understanding.

Exercises

The third part of a teaching lesson gives you practice and lets you apply what you have learned.

Multiplying by a One-Digit Number

The planetarium can hold 354 people for each show. On Saturday there are 6 shows. How many people can see a planetarium show on Saturday?



Multiply 6 and 354.

$$\begin{array}{r} {\scriptstyle 2} \\ 354 \\ \times\ 6 \\ \hline 4 \end{array}$$

6 × 4 = 24 or 2 tens 4 ones.

$$\begin{array}{r} {\scriptstyle 3\ 2} \\ 354 \\ \times\ 6 \\ \hline 24 \end{array}$$

6 × 5 tens = 30 tens.
2 more tens make 32 tens or 3 hundreds 2 tens.

$$\begin{array}{r} {\scriptstyle 3\ 2\ 0} \\ 354 \\ \times\ 6 \\ \hline 2124 \end{array}$$

6 × 3 hundreds = 18 hundreds.
3 more hundreds make 21 hundreds or 2 thousands 1 hundred.

2124 people can see a planetarium show on Saturday.

Working Together

Complete each multiplication.

1. 47 × 5 = 235

2. 36 × 7 = 252

3. 63 × 4

4. 2830 × 3

5. 134 × 6

6. 3271 × 8

Multiply.

7. 75 × 4

8. 684 × 5

9. 2604 × 3

10. 9431 × 9

11. 16 938 × 6

12. 40 536 × 8

Exercises

Multiply.

1. 59 × 5

2. 34 × 7

3. 87 × 6

4. 678 × 9

5. 951 × 7

6. 606 × 6

7. 1231 × 3

8. 4003 × 5

9. 4625 × 8

10. 20 968 × 4

11. 27 879 × 3

12. 72 342 × 7

13. 17 727 × 9

14. 8 × 941

15. 6 × 9214

16. 9 × 17

17. 2 × 47 216

18. 4 × 634

19. 8 × 5764

20. 5 × 712

21. 4 × 17 819

22. 9 × 5555

23. 7 × 76 008

24. 8 × 880

25. 4 × 9052

26. 3 × 5226

27. 6 × 10 375

28. 2 × 9999

29. 5 × 19 753

Solve.

30. There are 3 planetarium shows Saturday evening. How many people can see these shows?

31. The planetarium has a special show each weekday afternoon. How many people can see this show from Monday to Friday?

32. The school auditorium can hold 1250 people. How many people can see the 3 performances of the school play?

33. The football stadium in Vancouver holds 32 752 people. How many people can go to 8 Canadian Football League games there in a season?

34. The Montreal Forum holds 18 350 people for hockey. How many people can watch 4 Stanley Cup games in the Forum?

35. The baseball stadium in Toronto can hold 46 500 people. How many people can watch a 3-game series in the stadium?

Special Features

Practice with addition, subtraction, multiplication, and division

KEEPING SHARP

Some interesting ideas for fun and enrichment

try this

Lessons and activities to help you learn the skills you need for solving problems

PROBLEM SOLVING

Special * exercises give you more practice with problem solving.

Checking Up

End-of-unit lessons let you check how you have done with the work in the unit.

Checking Skills

Five special reviews let you check your skills with addition, subtraction, multiplication, and division.

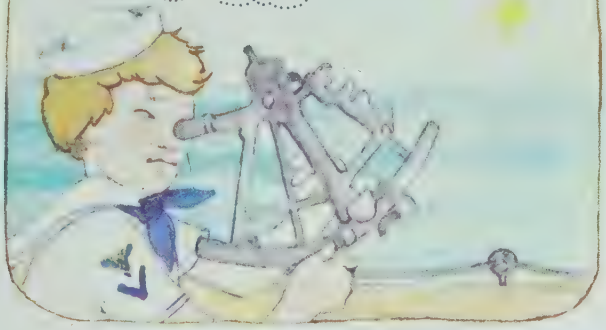
1 NUMERATION

Who Needs Numbers?

. . . or a clerk?

Could some numbers help me grow things?

. . . sail a ship?



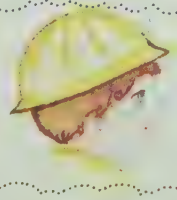
. . . or do police work?

Could I use them in creating?

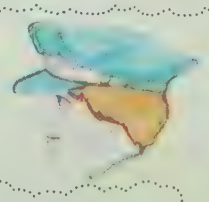
. . . excavating?

. . . running zoos?

. . . building bridges?

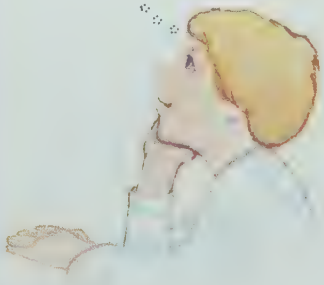


. . . fixing fridges?



. . . collecting news, or views, or dues?

As a pilot? or a miner? a performer on TV? as a worker for the city? or whatever else I'd like to be?

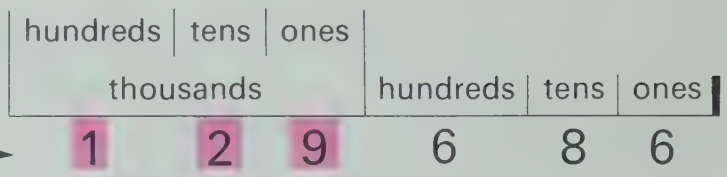


What would you like to be? How do you think you would use numbers?

Numbers to 999 999

Workers in Canada's 28 national parks take care of 129 686 km^2 (square kilometres) of park property.

In a numeral with four, five, or six digits, the digits in these three places show **thousands**.



The national parks cover *129 thousand 686* km^2.

In **expanded form**,

129 686 = 100 000 + 20 000 + 9 000 + 600 + 80 + 6

129 686 is the **standard form** for the numeral.

Working Together

Use the place-value chart shown above to help you answer these questions.

Example: The 2 in 129 686 means 2 ten thousands.

1. What does the 9 mean in 129 686?

2. What does each digit mean in 593 064?

3. What does the 129 mean in 129 686?

Complete.

Leave a space after the thousands.

4.	84 thousand 92	84 092
5.	260 thousand	?
6.	493 ? 768	493 768
7.	? thousand ?	324 089

Write each in expanded form.

8. 735 000

9. 90 420

10. 618 937

Write each in standard form.

11. 63 thousand 451

12. five hundred six thousand nine hundred

13. 400 000 + 70 000 + 300 + 90 + 5

14. 2 hundred thousands 8 ten thousands 2 hundreds 5 tens 7 ones

Exercises

Complete.

1.	801 thousand 253		?
2.	? thousand ?		74 006
3.	650 thousand		?
4.	?	?	438 000
5.	?	? ?	137 430

What does each 7 mean?

6. 327 908 **7.** 723 684

8. 19 704 **9.** 175 516

Write each in expanded form.

10. 235 000 **11.** 98 036

12. 560 804 **13.** 109 040

Write each in standard form.

14. two hundred ten thousand

15. seventy-three thousand fifty

16. five hundred forty-seven thousand four hundred one

17. 900 000 + 20 000 + 500

18. 40 000 + 1 000 + 80 + 6

19. 3 hundred thousands 2 thousands 5 hundreds 9 tens

20. 6 ten thousands 4 hundreds

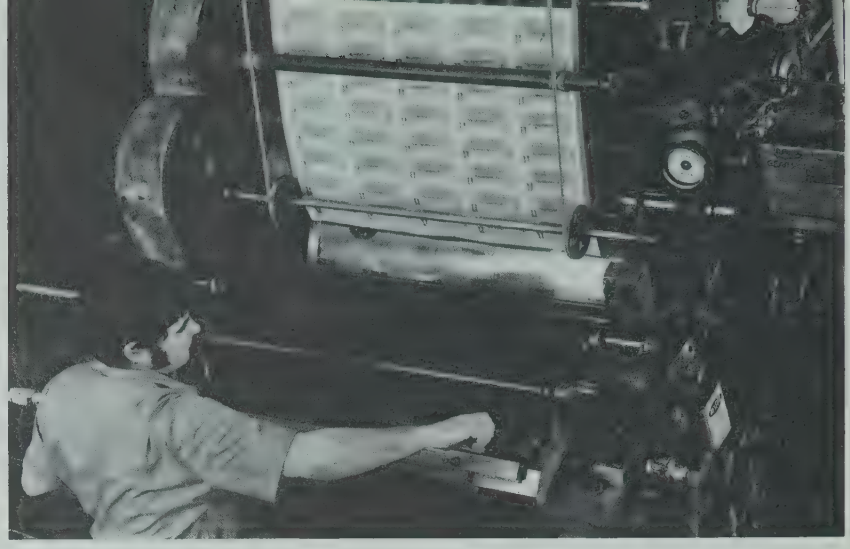
21. 2 hundred thousands 8 tens 4 ones

Write each sentence using a numeral in standard form.

22. The largest national park, Wood Buffalo, covers forty-four thousand eight hundred seven square kilometres.

23. There are 105 thousand 811 km^2 in the 5 largest national parks and 23 thousand 875 km^2 in the other 23.

Numbers to 999 999 999



At the end of 1977 there were 74 788 800 five-dollar bills in use.

In a numeral with seven, eight, or nine digits, the digits in these three places show **millions**.

millions			thousands					
hundreds	tens	ones	hundreds	tens	ones	hundreds	tens	ones
	7	4	7	8	8	8	0	0

At the end of 1977 there were 74 million 788 thousand 800 five-dollar bills in use.

If you know three-digit numerals and the words "thousands" and "millions", you can read any numeral with up to nine digits.

Working Together

Use a place-value chart like the one shown above to help you answer these questions.

Example: The 3 in 436 028 500 means 3 ten millions.

1. What does the 8 mean in 58 064 731?

2. What does each digit mean in 207 146 853?

3. What does the 125 mean in 125 280 371?

Complete.

4.	384 million 90 thousand 524	384 090 524
5.	? million ? thousand ?	9 403 861
6.	32 million 529 thousand 600	?
7.	? ? ? ? ?	627 306 005

Write each in expanded form.

8. 4 200 000

9. 28 063 400

10. 576 381 429

Write each in standard form.

11. eight hundred million

12. seventy million six thousand

13. 10 000 000 + 500 000 + 7 000 + 40 + 8

14. 3 hundred millions 8 ten millions 7 ten thousands 1 thousand 9 tens

Exercises

Complete.

1.	14	million	519	thousand	628	?
2.	?	million	?	thousand	?	683 059 327
3.	23	million	5	thousand	30	?
4.	?	million	?	thousand	?	200 049 008
5.	789	million	723	thousand		?
6.	?	?	?	?	?	120 400 085
7.	?	?			?	5 000 100

What does each 4 mean?

8. 346 763 009

9. 400 137 998

10. 84 000 000

Write each in expanded form.

11. 3 087 406

12. 123 456 789

Write each in standard form.

13. one hundred ninety-nine million nine hundred fifty-seven thousand eighty

14. 2 ten millions 3 millions 4 thousands 9 hundreds 1 ten 6 ones

15. 700 million 209 thousand 519

16. 70 000 000 + 5 000 000 + 30 000

17. four million six thousand

18. two hundred six million twelve

Write the sentence using numerals in standard form.

19. At the end of 1977, there were in use 234 million 887 thousand one-dollar bills,

20. 89 million 602 thousand two-dollar bills,

21. 119 million 636 thousand 400 ten-dollar bills,

22. 196 million 678 thousand 850 twenty-dollar bills, and

23. 18 million 162 thousand 630 hundred-dollar bills.

How much is one million dollars?

$1 000 000 could buy

1. 1 $1 000 000 ranch.

2. [redacted] $100 000 homes.

3. [redacted] $10 000 cars.

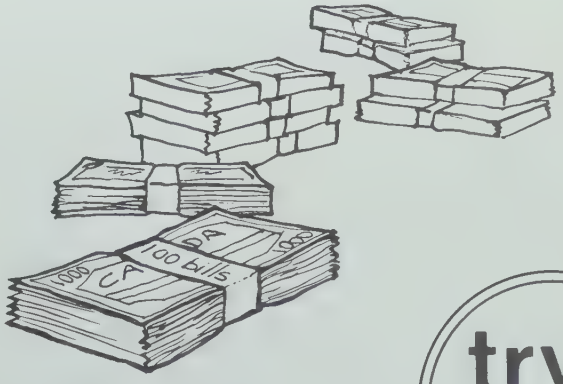
4. [redacted] $1 000 motorcycles.

5. 10 000 $[redacted] bicycles.

6. 100 000 $[redacted] running shoes.

7. [redacted] $[redacted] milkshakes.

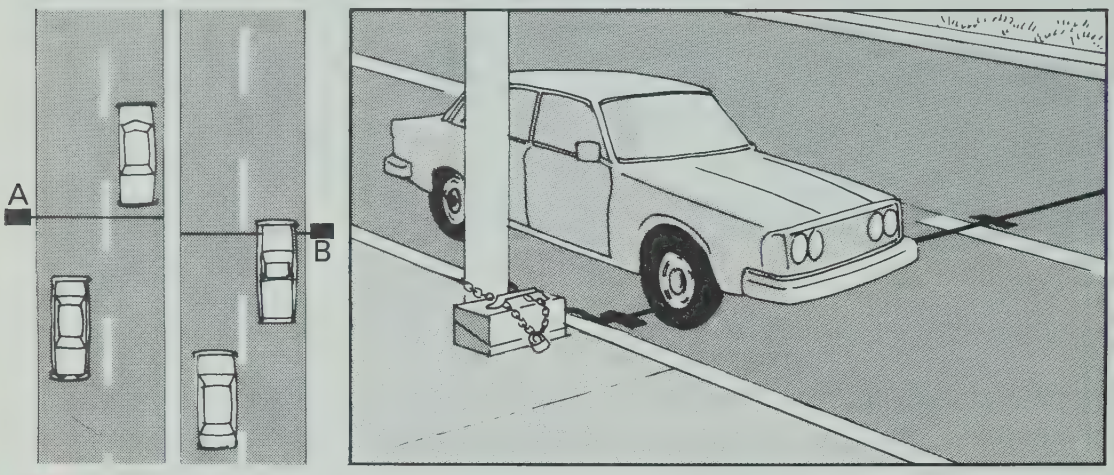
8. What would you do with $1 000 000?



try this

Comparing and Ordering Numbers

In one week, machine A counted 131 210 vehicles. Machine B counted 129 984 vehicles. Which machine counted more vehicles?



1 31 210
1 29 984
} both show 1 hundred thousand.

1 3 1 210 shows 3 ten thousands.

1 2 9 984 shows 2 ten thousands.

3 is greater than 2, so

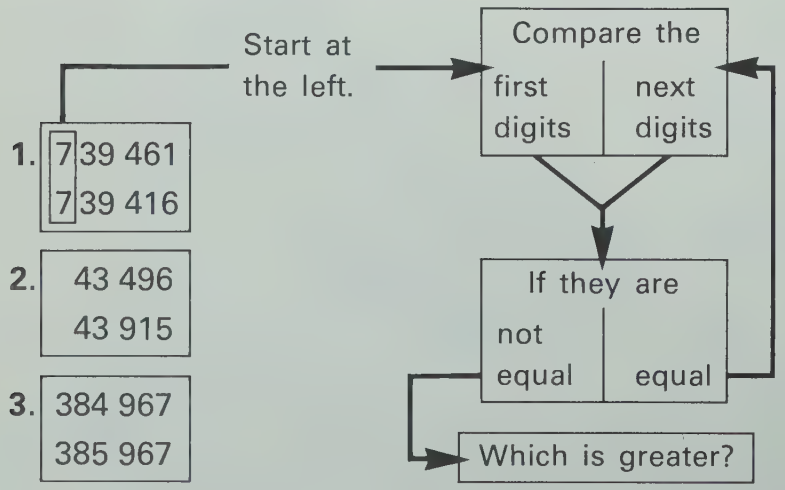
131 210 is greater than 129 984.

Machine A counted more vehicles.

3 > 2, so
131 210 > 129 984.

Working Together

Follow the path for each pair of numbers.



1. 7 39 461
   7 39 416
2. 43 496
   43 915
3. 384 967
   385 967

Which is greater,

4. 743 384 or 734 395?
5. 508 733 or 508 377?
6. 84 997 or 89 412?

List from least to greatest.

7. 197 403
   19 574
   195 743
   197 430

Exercises

Which is greater,

1. 69 158 or 69 258?
2. 35 609 or 34 609?
3. 17 308 or 162 038?
4. 699 832 or 689 925?
5. 389 502 or 389 503?
6. 247 792 or 247 729?

Use >, <, or = to make true statements.

Example: 321 698 is less than 321 700, so
321 698 < 321 700.

7. 349 527 ◯ 449 525
8. 18 805 ◯ 18 750
9. 529 510 ◯ 529 509
10. 689 412 ◯ 689 412
11. 573 375 ◯ 573 757
12. 900 627 ◯ 899 235

List from least to greatest.

13.

673 058	637 508	637 985
97 805	639 850	637 580

List from greatest to least.

14.

174 215	174 156	71 561
174 216	173 612	174 205

Numbers shown with more than six digits also may be compared.

Example:

7 is greater than 5, so
13 728 651 > 13 582 156.

Use >, <, or = .

15. 2 753 900 ◯ 2 729 300
16. 148 962 705 ◯ 184 962 075
17. 36 024 571 ◯ 34 206 751

List from least to greatest.

18.

13 201 596	13 210 569
132 569 713	13 201 956

even (e)	odd (o)
0, 2, 4, 6, 8	1, 3, 5, 7, 9

The greatest number that can be shown with digits in this pattern | oeo eoe | is | 989 898 | .

What are the greatest numbers that can be shown with digits in these patterns?

1. eoe oeo
2. ooo eee
3. eeo oee
4. oee oee

What are the least numbers that can be shown with digits in these patterns?

5. oeo eoe
6. eoe oeo
7. ooo eee
8. ooe eoo

Repeat the above exercises. This time, do not use any digit more than once in each numeral you write.

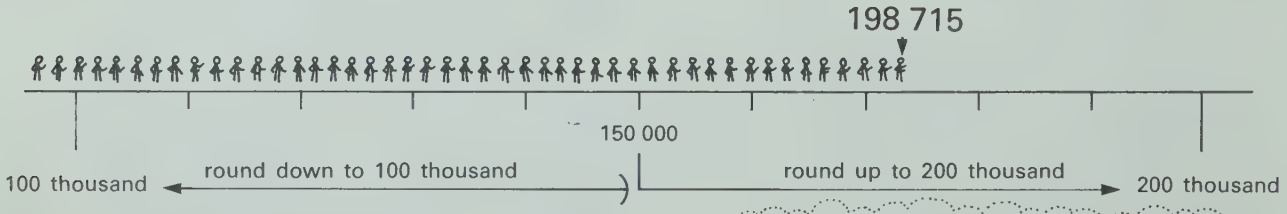
try this

Rounding

In a recent school year, each of five provinces had about 200 000 students in elementary and secondary schools.

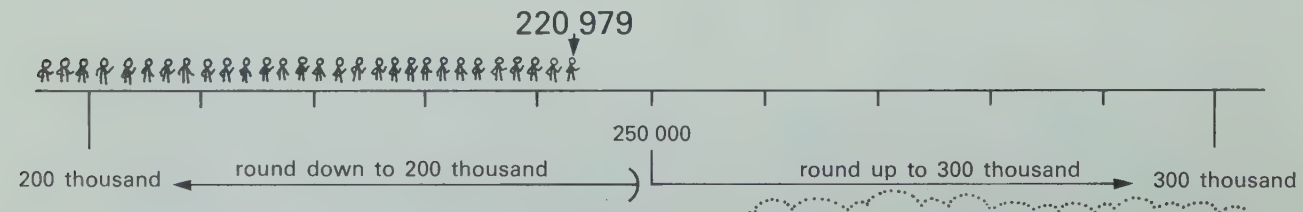
Province	Number of Students
Alberta	418 715
British Columbia	511 671
Manitoba	232 470
New Brunswick	155 819
Newfoundland	153 576
Nova Scotia	198 715
Ontario	1 974 702
Prince Edward Island	27 225
Quebec	1 297 690
Saskatchewan	220 979

Nova Scotia had 198 715 students.



198 715 rounded to the nearest hundred thousand is 200 000.

Saskatchewan had 220 979 students.



220 979 rounded to the nearest hundred thousand is 200 000.

Nova Scotia and Saskatchewan were two of the five provinces that had about 200 000 students each.

Working Together

When rounding to [this place], first check the digit in (this place)

hundreds	tens	ones			
thousands			hundreds	tens	ones

1. When rounding to the nearest ten thousand, first check the digit in the ? place.

2. When rounding to the nearest thousand, first check the digit in the ? place.

If the digit you check is 5, 6, 7, 8, or 9, round up.
If the digit you check is 0, 1, 2, 3, or 4, round down.

Would you round down or up to the nearest hundred thousand?

3. 482 651 **4.** 549 567

Would you round down or up to the nearest ten thousand?

5. 27 225 **6.** 511 671

Round to the

7. nearest thousand.
324 517

8. nearest ten thousand.
796 487

9. nearest hundred thousand.
329 870

Exercises

		thousand	ten thousand	hundred thousand
1.	418 715	?	?	?
2.	232 470	?	?	?
3.	155 819	?	?	?
4.	153 576	?	?	?

The number of students for all ten provinces was 5 191 562. Round this number to the nearest

5. thousand **6.** ten thousand **7.** hundred thousand **8.** million

Round to the nearest

		million	ten million	hundred million
9.	254 859 926	?	?	?
10.	839 581 074	?	?	?

Roman Numerals

Many motion pictures use Roman numerals to show the year in which they were completed.

There are seven basic Roman numerals.

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

The cartoon was completed in

M	CM	LX	VII
1000	900	60	7

1967

Working Together

Choose no more than one numeral from each chart to make Roman numerals.

Numeral for one thousand
1000 = M

Numerals for multiples of 100
100 = C
200 = CC
300 = CCC
400 = CD
500 = D
600 = DC
700 = DCC
800 = DCCC
900 = CM

Numerals for multiples of 10
10 = X
20 = XX
30 = XXX
40 = XL
50 = L
60 = LX
70 = LXX
80 = LXXX
90 = XC

Numerals for 1 to 9
1 = I
2 = II
3 = III
4 = IV
5 = V
6 = VI
7 = VII
8 = VIII
9 = IX

Example:

For 1492, use M, CD, XC, and II to get MCDXCII.

1. 1859

2. 1507

3. 370

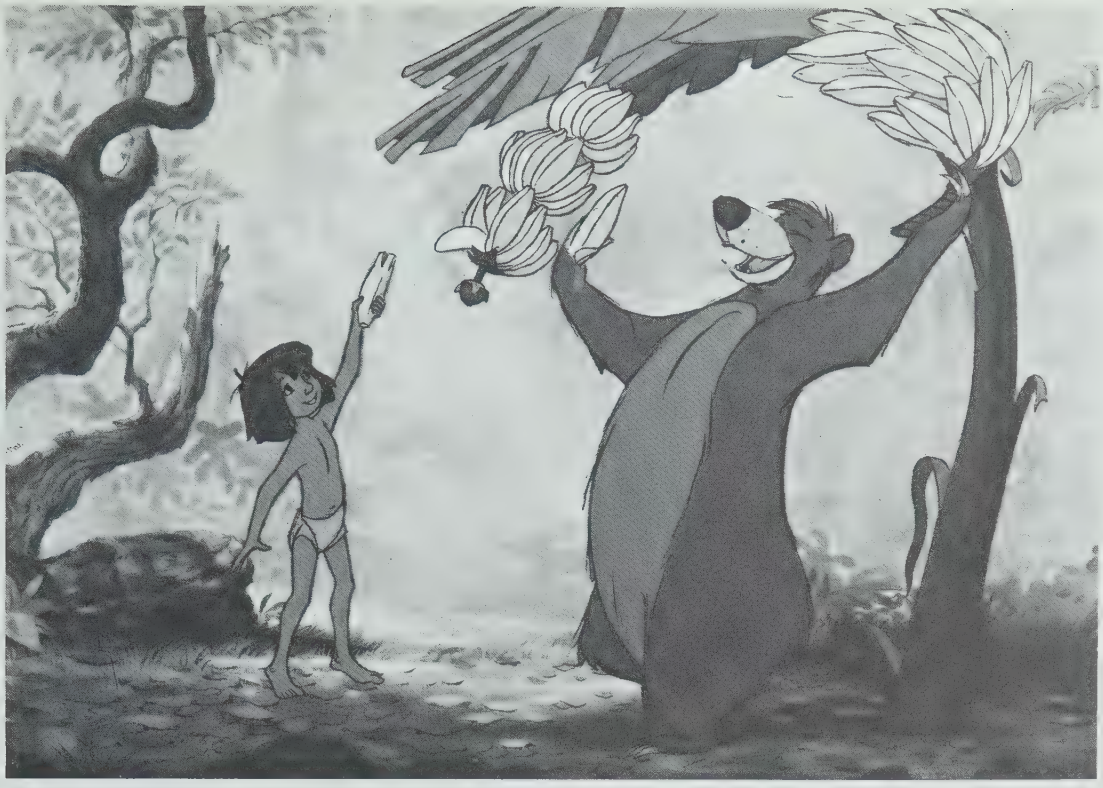
Ring the thousands, the hundreds, the tens, and the ones. Write the standard form for each.

Examples: (M) (CM) (LXXX) (VI) = 1986

(M) (XC) (IV) = 1094

4. MDCCCXXXIX **5.** MCDV **6.** DCXL

There is no Roman numeral for zero, so nothing is used to show zero hundreds.



© MCMLXVII Walt Disney Productions

Exercises

Write the Roman numerals.

1. 1741
2. 676
3. 54
4. 1490
5. 1089
6. 1915
7. 230
8. 509
9. 1802
10. 943

Write the standard form for each.

11. MCCXXXIV
12. DCCXXVI
13. LIX
14. MCDXL
15. MLXIII
16. CMXCIX
17. MCCCVII
18. MIV
19. MX
20. MDCCCLXXXVIII

Copy each sentence. Replace numerals in standard form with Roman numerals. Replace Roman numerals with the standard form.

21. The movie was completed in 1979.

22. The television show was made in MCMLXIV.

23. The book was printed in either 1899 or 1900.

24. The old coin was dated MCDXLVIII.

25. Leonardo da Vinci painted *Mona Lisa* about 1503.

26. The cornerstone on the building showed MCMLX.

27. The newspaper was first published in 1884.

28. Rome was ruled by an emperor until CDLXXVI.

Finding the Information Needed

Stuart wanted to know the number of true alarms and the number of false alarms received by the Fire Department.

He called the Fire Department to find out.

How would you get this information?

1. the number of kilometres of highways in Canada
2. the leading batter for the Montreal Expos
3. the distance you plan to travel on a vacation trip
4. **the distance you travelled on a vacation trip.**
5. the number of families named Smith in your town
6. the price of a bicycle that you could afford
7. the current Top Ten records
8. the current best-selling book
9. the number of leaves on a tree
10. how high you can fly a kite
11. the year that Captain Cook landed on the Pacific Coast
12. the number of cars that pass your school in each direction
13. how much money you will need for the next month

PROBLEM SOLVING

Checking Up

Think of a place-value chart to help you tell what the 7 means in each numeral.

1. 407 038 **2.** 44 702 **3.** 708 529 **4.** 572 681 920

Complete

5. 38 000 = ▒ thousand

6. 301 592 = ▒ thousand ▒

7. 69 005 882 = ▒ million ▒ thousand ▒

Write each in expanded form.

8. 30 200 **9.** 806 010 **10.** 14 095 370

Write each in standard form.

11. 38 thousand 395

12. 324 thousand 58

13. four hundred nine thousand

14. sixty-five thousand two hundred

15. 2 hundred thousands 5 ten thousands 2 thousands

16. 300 000 + 80 000 + 200 + 6

17. 5 000 000 + 70 000 + 3 000 + 20

18. eight hundred ninety million nine hundred seven thousand thirty-five

19. 6 hundred millions 7 millions 8 ten thousands 3 thousands 5 hundreds

20. LXXXIX **21.** CDLXXIII **22.** MCMXL **23.** MCXCIV

Use >, <, or = to make true statements.

24. 268 739 ◯ 268 439

25. 684 597 ◯ 684 597

26. 21 085 ◯ 20 805

27. 64 356 895 ◯ 64 365 598

List from least to greatest.

28.

24 753	224 537
224 375	242 357

List from greatest to least.

29.

807 085	807 028
807 580	89 250

Round to the

30. nearest thousand.
519 800

31. nearest ten thousand.
376 358

32. nearest hundred thousand.
349 625

33. nearest million.
12 903 257

34. nearest ten million.
25 084 311

35. nearest hundred million.
107 399 841

2 ADDITION AND SUBTRACTION

Basic Addition Facts

There had been 8 members of the Dionne family until May 28, 1934 when 5 baby girls were born.

$8 + 5 = 13$

$$\begin{array}{r} 8 \\ 5 \\ \hline 13 \end{array}$$

8 — addend
5 — addend
13 — sum

Then there were 13 in the Dionne family.

Exercises

Write the six sums for each row.

Have someone time you for some rows. Which row can you do the fastest?

1. →	5 + 2	4 + 3	3 + 5	2 + 7	1 + 4	2 + 2
2. →	3 + 9	3 + 4	8 + 7	0 + 9	3 + 8	7 + 7
3. →	7 + 1	9 + 1	4 + 1	8 + 1	6 + 1	1 + 1
4. →	6 + 8	1 + 9	7 + 5	3 + 6	9 + 7	6 + 6
5. →	5 + 9	5 + 6	5 + 7	5 + 4	5 + 8	5 + 5
6. →	7 + 8	6 + 5	9 + 4	7 + 2	6 + 9	8 + 8
7. →	4 + 0	0 + 7	3 + 0	9 + 0	0 + 6	0 + 0
8. →	9 + 8	7 + 0	4 + 8	6 + 3	8 + 6	4 + 4
9. →	0 + 3	1 + 3	1 + 5	4 + 5	4 + 9	9 + 9
10. →	6 + 7	3 + 1	8 + 5	1 + 8	8 + 4	3 + 3
	↓	↓	↓	↓	↓	↓
	11.	12.	13.	14.	15.	16.

Try the additions again. This time, list the sums for each column.

Which could you list faster, the sums for a row or for a column?

Addition with No Regrouping

113 036 people were living in Halifax in 1976. Across the harbor, 64 452 people were living in Dartmouth. How many people were living in both cities?

Add 113 036 and 64 452.

Show the addends in vertical form.

hundred thousands	ten thousands	thousands	hundreds	tens	ones
1	1	3	0	3	6
	6	4	4	5	2

Then use basic addition facts place by place to find the sum.

Add ones.
Add tens.
Add hundreds.

1	1	3	0	3	6
	6	4	4	5	2
			4	8	8

Add thousands.
Add ten thousands.
Add hundred thousands.

1	1	3	0	3	6
	6	4	4	5	2
1	7	7	4	8	8

177 488 people were living in Halifax and Dartmouth.

Exercises

Add.

1. 27 + 42

2. 234 + 525

3. 6234 + 3762

4. 15 911 + 24 057

5. 144 421 + 14 363

6. 38 + 51

7. 707 + 181

8. 5235 + 2064

9. 26 381 + 1 608

10. 27 531 + 30 131

11. 2 152 + 11 402

Adding Four-Digit Numbers with Regrouping

1965 km (kilometres) of the Alaska Highway are in Canada. 486 km are in the United States. How long is the Alaska Highway?

Add 1965 and 486.

Show the addends in vertical form.

$$\begin{array}{r} 1965 \\ +\ 486 \\ \hline \end{array}$$

Add ones. Regroup 11 ones as 1 ten, 1 one.

$$\begin{array}{r} {\scriptstyle 1} \\ 1965 \\ +\ 486 \\ \hline \ 1 \end{array}$$

Add tens. Regroup 15 tens as 1 hundred, 5 tens.

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 1965 \\ +\ 486 \\ \hline \ 51 \end{array}$$

Add hundreds. Regroup 14 hundreds as 1 thousand, 4 hundreds.

$$\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 1965 \\ +\ 486 \\ \hline \ 451 \end{array}$$

Add thousands.

$$\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 1965 \\ +\ 486 \\ \hline 2451 \end{array}$$

The Alaska Highway is 2451 km long.

Working Together

Add by following the steps.

1.

$$\begin{array}{r} 4536 \\ +\ 3725 \\ \hline \end{array}$$

Add ones and regroup.
Add tens.
Add hundreds and regroup.
Add thousands.

Add.

2. $\begin{array}{r} 7039 \\ +\ 2937 \\ \hline \end{array}$

3. $\begin{array}{r} 3508 \\ +\ 4655 \\ \hline \end{array}$

4. 3987 + 2835

5. 2296 + 5763

6. 379 + 2389

Exercises

Add.

1. 3467 + 5928

2. 4322 + 1494

3. 6048 + 1971

4. 5227 + 384

5. 6294 + 3536

6. 5930 + 3491

7. 7868 + 673

8. 3968 + 3987

9. 5397 + 2857

10. 3097 + 989

11. 621 + 6624

12. 1644 + 2948

13. 4937 + 273

14. 3587 + 1441

15. 4016 + 2666

16. 503 + 3826

17. 1175 + 8169

18. 5815 + 1875

Solve.

19. Canada's border with Alaska is 2478 km long. Canada's border with the rest of the United States is 6416 km long. How long is Canada's border with the United States?

20. 5715 people lived in Lloydminster, Alberta in 1976. 4432 people lived in Lloydminster, Saskatchewan. How many people lived in Lloydminster?

21. 398 people lived in Flin Flon, Saskatchewan in 1976. 8033 people lived in Flin Flon, Manitoba. How many people lived in Flin Flon?

Addition with Regrouping

More than 137 000 people became Canadian citizens in 1976. Of these, 38 061 had been citizens of the United Kingdom and 58 458 had been citizens of other countries in Europe. How many people from Europe became Canadian citizens?

Add 38 061 and 58 458.

Add ones, tens, and hundreds.

$$\begin{array}{cccccc} & & & 1 & & \\ 3 & 8 & & 0 & 6 & 1 \\ 5 & 8 & & 4 & 5 & 8 \\ \hline & & & 5 & 1 & 9 \end{array}$$

Remember to regroup when needed.

Then, add thousands and ten thousands.

$$\begin{array}{cccccc} 1 & & & & & \\ 3 & 8 & & 0 & 6 & 1 \\ 5 & 8 & & 4 & 5 & 8 \\ \hline 9 & 6 & & 5 & 1 & 9 \end{array}$$

In 1976, 96 519 people from Europe became Canadian citizens.

In that same year, 40 988 people from other countries of the world became Canadian citizens. How many people became Canadian citizens?

You can add 38 061, 58 458, and 40 988, or . . .

. . . you can add 40 988 to the number who came from Europe.

$$\begin{array}{cccccc} & 1 & 1 & 2 & 1 & \\ & 3 & 8 & 0 & 6 & 1 \\ & 5 & 8 & 4 & 5 & 8 \\ & 4 & 0 & 9 & 8 & 8 \\ \hline 1 & 3 & 7 & 5 & 0 & 7 \end{array} \qquad \begin{array}{cccccc} & & 1 & 1 & 1 & \\ & 9 & 6 & 5 & 1 & 9 \\ & 4 & 0 & 9 & 8 & 8 \\ \hline 1 & 3 & 7 & 5 & 0 & 7 \end{array}$$

137 507 people became Canadian citizens in 1976.

Working Together

Add by following the steps.

1.

$$\begin{array}{r} 34\,769 \\ +\ 25\,483 \\ \hline \end{array}$$

Add ones and regroup.
Add tens and regroup.
Add hundreds and regroup.
Add thousands and regroup.
Add ten thousands.

2.

$$\begin{array}{r} 1934 \\ 1862 \\ +\ 518 \\ \hline \end{array}$$

Add ones and regroup.
Add tens and regroup.
Add hundreds and regroup.
Add thousands.

Add.

3. $\begin{array}{r} 70\,935 \\ +\ 25\,437 \\ \hline \end{array}$

4. $\begin{array}{r} 21\,743 \\ 43\,962 \\ +\ 64\,531 \\ \hline \end{array}$

5. 83 457 + 12 568

6. 9 135 + 17 648 + 6 278

Exercises

Add.

1. $\begin{array}{r} 12\,445 \\ +\ 15\,684 \\ \hline \end{array}$

2. $\begin{array}{r} 66\,357 \\ +\ 53\,926 \\ \hline \end{array}$

3. $\begin{array}{r} 25\,256 \\ +\ 8\,359 \\ \hline \end{array}$

4. $\begin{array}{r} 74\,181 \\ +\ 57\,834 \\ \hline \end{array}$

5. $\begin{array}{r} 19\,064 \\ 2\,379 \\ +\ 27\,273 \\ \hline \end{array}$

6. $\begin{array}{r} 7\,352 \\ 24\,378 \\ +\ 989 \\ \hline \end{array}$

7. 6 628 + 26 447

8. 39 218 + 5 494 + 24 039

9. 37 947 + 93 627

10. 97 156 + 8 492 + 178 + 6 076

11. 40 892 + 20 897 + 59 024

12. 8 393 + 15 418 + 37 564

13. 5398 + 1760 + 5187

14. 19 738 + 14 829

15. 443 + 2 863 + 53 483

This chart shows the number of immigrants in each province who became citizens in 1976.

Alta.	8 260	N.S.	1 143
B.C.	22 290	Ont.	78 724
Man.	3 953	P.E.I.	91
N.B.	493	Que.	20 638
Nfld.	260	Sask.	1 371

How many immigrants became citizens in

16. either New Brunswick or Quebec?

*__17.__ an island province?

*__18.__ the Prairie Provinces?

*__19.__ the three Maritime Provinces?

*__20.__ one of the provinces west of Ontario?

Practice

Add.

1. 2418 + 844

2. 3674 + 1353

3. 15 236 + 6 376

4. 29 135 + 45 899

5. 98 736 + 22 647

6. 149 + 376 + 192

7. 5126 + 465 + 5056

8. 7 624 + 18 908 + 758

9. 14 698 + 29 786 + 8 737

10. 17 534 + 26 583 + 17 584

11. 3894 + 519

12. 796 + 2375

13. 5 527 + 97 274

14. 18 964 + 57 947

15. 17 971 + 9 479

16. 3586 + 8498

17. 854 + 8309 + 986

18. 6 756 + 4 992 + 10 482

19. 20 825 + 59 129 + 46 230

20. 7 196 + 16 073 + 2 282 + 15 464

Amounts of money are added just like whole numbers.

Examples:

1 1 1 1	1 1 1	1 2 1
$16 548	$265.93	$306.73
19 497	85.46	242.97
$36 045	$351.39	918.34
		$1468.04

Add.

21. $8423 + 8683

22. $235.87 + 58.38

23. $ 5 769 + 11 974 + 4 463

24. $221.61 + 63.42 + 90.83 + 102.24

25. $82 942 + $65 329

26. $45.67 + $456.78

27. $3 698 + $25 858 + $4 476

28. $106.65 + $43.75 + $172.95

Use >, <, or = to make true statements.

29. 4261 + 4973 ◍ 7766 + 1666

30. $4 498 + $77 167 ◍ $72 998 + $8 658

31. 31 729 + 11 359 ◍ 12 751 + 27 648

32. 843 + 974 + 596 ◍ 1828 + 585

33. $236.67 + $269.48 ◍ $506.15

34. 29 187 ◍ 7 379 + 949 + 21 672

Jill's father works full time.
Her mother works part time.

35. Last year Jill's father earned $9348. Her mother earned $4875. How much did they earn together?

36. Jill's mother had to pay $188.50 and her father had to pay $1351.70 for income taxes. What was their total income tax?

37. With income taxes paid, Jill's father earned $7996.30 and her mother earned $4686.50. How much was that in all?

38. Jill's mother paid a babysitter $248.75 and a nursery school $367.50 during the year to help care for Jill's little brother. How much did this cost in all?

39. Jill's mother saved $475.87 and her father saved $665.58 for the year. How much did they save in all?

A *palindrome* reads the same from left to right or from right to left.

DID	TOOT	RADAR
121	7337	54945

Give another example of a palindrome

1. with three letters.
2. with four letters.
3. with four digits.
4. with five digits.

786 is not a palindrome, but follow these steps using addition.

$$\begin{array}{r} 786 \\ +\ 687 \\ \hline 1473 \end{array}$$

$$\begin{array}{r} 1473 \\ +\ 3741 \\ \hline 5214 \end{array}$$

$$\begin{array}{r} 5214 \\ +\ 4125 \\ \hline 9339 \end{array}$$

a palindrome!

Choose any number.

5. Reverse the order of its digits and add. Is the sum a palindrome?

6. If not, repeat the above step one or more times to see if you can get a palindrome.

try this

Estimating the Sum

On many weekends over 100 000 people will go to the Canadian Football League games.

Here are how many people went to the games one weekend.

To estimate the total number who went to a game, round to the nearest ten thousand and add.

Ottawa at Montreal	62 157	or about	60 000
British Columbia at Hamilton	19 133	or about	20 000
Calgary at Winnipeg	23 663	or about	20 000
Toronto at Edmonton	25 388	or about	30 000
		About	130 000 people

went to the Canadian Football League games one weekend.

For the exact sum, add in the usual way.

$$\begin{array}{r} {\scriptstyle 2\,1\quad 2\,2} \\ 62\,157 \\ 19\,133 \\ 23\,663 \\ 25\,388 \\ \hline 130\,341 \end{array}$$

The exact number of people who went to the games was 130 341.

Working Together

Round to the nearest ten thousand.

1. 10 726 **2.** 15 478

Round to the nearest thousand.

3. 37 298 **4.** 9504

Round to the nearest ten thousand and add to estimate the sum.

5. 29 345 + 32 989

6. 9 823 + 21 498 + 35 000

Round to the nearest thousand and add to estimate the sum.

7. 8 206 + 11 095 + 14 500

8. 23 528 + 19 700

Complete the chart.

		Estimate	Exact sum
9.	11 294 + 4 370 + 13 806	?	?
10.	48 500 + 22 468 + 18 849	?	?

When estimating these sums, round *all* the addends to either thousands or ten thousands.

Montreal	69 000
Ottawa	35 342
Toronto	54 040
Hamilton	34 100
Winnipeg	32 950
Saskatchewan	28 000
Calgary	35 500
Edmonton	42 640
British Columbia	32 752

Exercises

Round and add
to estimate each sum.
Then find the exact sum.

1.
3467
8920
1674

2.
6 357
13 698
15 207

3.
14 689
33 499
29 502
35 000

4. $3949 + $7701 + $4383

5. 2377 + 6098 + 5500 + 1842

6. 10 672 + 22 984

7. $19 079 + $7 386 + $14 768

8. 68 396 + 52 928 + 76 004

9. 2996 + 3728 + 8276 + 1500

10. $13 810 + $19 475

11. 33 716 + 18 309 + 15 691

12. 9 748 + 10 874 + 19 487

The chart shows the number of people that Canadian Football League stadiums can hold.

13. Estimate, then find the exact number that these nine stadiums can hold.

At most, four league games can be played on one weekend.

14. Which four stadiums will hold the greatest number of people? Estimate, then find the exact number that these four stadiums can hold.

15. Which four stadiums will hold the least number of people? Estimate, then find the exact number that these four stadiums can hold.

Practice

First, estimate the sum without doing any work on paper.

Then, add and compare with your estimate.

Example:

23 749
18 175
41 924
40 000

If the two numbers are quite different, look for a mistake in your work.

1. 24 975
19 498
37 180

2. 38 918
29 782

3. 14 500
29 100
30 954
18 266

4. 23 184
8 762
10 900

Estimate to ten thousands. → ? ? ? ?

5. 5765
9328
7923

6. 13 745
8 892

7. 23 702
12 450
33 849

8. 26 488
3 912
17 500
9 896

Estimate to thousands. → ? ? ? ?

Estimate the number of ten thousands in each row and column.

9.

14 972	27 013	17 450	■0 000
19 288	21 750	9 107	■0 000
23 666	15 200	44 879	■0 000
■0 000	■0 000	■0 000	■0 000

Estimate the number of thousands in each row and column.

10.

4 098	11 624	8 450	■000
15 725	8 902	2 607	■000
6 748	9 813	15 450	■000
■000	■000	■000	■000

Use *each* of the ten digits
0, 1, 2, 3, 4, 5, 6, 7, 8, 9
just one time in each of these:

1. Write two numbers that have the greatest sum.
2. Find two other numbers that have the same sum.
3. Write two numbers that have the least sum.
4. Find two other numbers that have the same sum.

PROBLEM SOLVING

Addition and Subtraction Families

There is a group of four statements that show how the numbers 5, 7, and 12 are related.

This group is called a *family*.

$5 + 7 = 12$ $\quad 7 + 5 = 12$ $\quad 12 - 7 = 5$ $\quad 12 - 5 = 7$

Working Together

Complete each family.

1. $9 + 6 = 15$ $\quad 6 + 9 = \square$

$\square - 6 = 9$ $\quad \square - 9 = 6$

2. $3 + 5 = \square$ $\quad 5 + 3 = \square$

$\square - 5 = 3$ $\quad \square - 3 = 5$

3. $8 + 7 = \square$ $\quad \square + \square = \square$

$\square - 7 = 8$ $\quad \square - \square = \square$

4. $\square + 6 = 10$ $\quad \square + \square = \square$

$10 - 6 = \square$ $\quad 10 - \square = \square$

Give the complete family.

5. $7 + 2 = 9$ **6.** $13 - 6 = 7$ **7.** $5 + 5 = 10$ **8.** $4 + 8$ **9.** $12 - 3$

Some families have only two members.

Exercises

Write the complete families.

1. $6 + 3 = 9$	**2.** $7 - 4 = 3$	**3.** $7 + 7 = 14$	**4.** $13 - 8 = 5$
5. $1 + 4$	**6.** $11 - 9$	**7.** $3 - 0$	**8.** $6 + 0$
9. $7 + 4$	**10.** $8 + 4$	**11.** $14 - 6$	**12.** $7 + 3$
13. $8 + 8$	**14.** $16 - 7$	**15.** $8 - 8$	**16.** $5 + 6$
17. $4 + 9$	**18.** $14 - 9$	**19.** $12 - 6$	**20.** $3 + 8$

The two numbers 4 and 7 are both part of two families.

Add 4 and 7 and get a member of one family.	$4 + 7 = 11$
Subtract 4 from 7 and get a member of another family.	$7 - 4 = 3$

Write *two families* for each pair of numbers.

21. 4 and 6	**22.** 9 and 9	**23.** 3 and 2	**24.** 2 and 8
25. 9 and 5	**26.** 2 and 7	**27.** 8 and 9	**28.** 3 and 3

Subtraction with No Regrouping

The travel company sold 2675 Canadian tours for the summer.
It sold 1154 Canadian tours for the rest of the year.
How many more Canadian tours did it sell for the summer?

Subtract 1154 from 2675.

Show 2675 – 1154 in vertical form. Then use basic subtraction facts place by place to find the *difference*.

Subtract ones.

$$\begin{array}{r} 2675 \\ -\ 1154 \\ \hline 1 \end{array}$$

Subtract tens.

$$\begin{array}{r} 2675 \\ -\ 1154 \\ \hline 21 \end{array}$$

Subtract hundreds.

$$\begin{array}{r} 2675 \\ -\ 1154 \\ \hline 521 \end{array}$$

Subtract thousands.

$$\begin{array}{r} 2675 \\ -\ 1154 \\ \hline 1521 \end{array}$$

The travel company sold 1521 more Canadian tours for the summer than for the rest of the year.

Exercises

Subtract.

1. $\begin{array}{r} 9802 \\ -\ 2501 \end{array}$ **2.** $\begin{array}{r} 6379 \\ -\ 5106 \end{array}$ **3.** $\begin{array}{r} 13\,296 \\ -\ 2\,274 \end{array}$ **4.** $\begin{array}{r} 4774 \\ -\ 4351 \end{array}$ **5.** $\begin{array}{r} 2995 \\ -\ 543 \end{array}$

6. 6155 – 3014 **7.** 8862 – 3251 **8.** 1387 – 1046
9. 4595 – 192 **10.** 7776 – 1420 **11.** 9566 – 5461

Find the difference of

12. 438 and 216. **13.** 783 and 5995. **14.** 1864 and 731.
15. 7697 and 7215. **16.** 6437 and 7739. **17.** 435 and 8695.

You can use addition to check subtraction.

Example: Subtract. Add.

$$\begin{array}{r} 3415 \\ -\ 1739 \\ \hline 1676 \end{array} \qquad \begin{array}{r} 1676 \\ +\ 1739 \\ \hline 3415 \end{array}$$

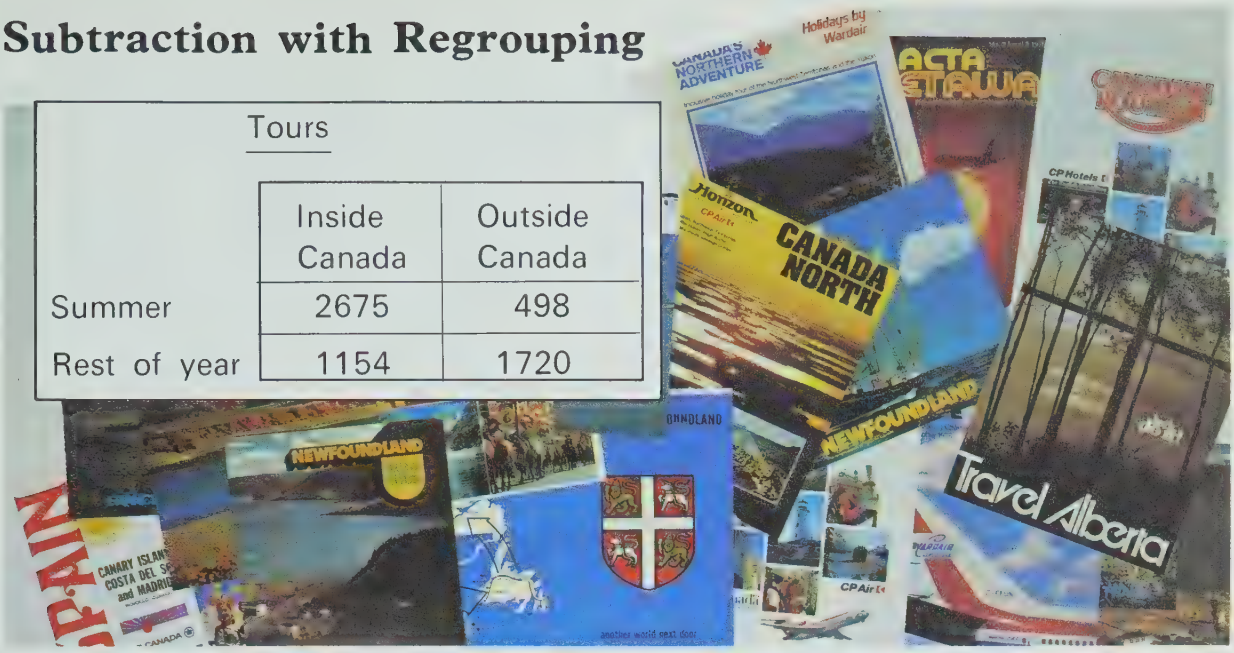
If the sum does not match the first number in the subtraction, there is a mistake in your work.

18. Check your results in the odd-numbered exercises above.

Subtraction with Regrouping

Tours

	Inside Canada	Outside Canada
Summer	2675	498
Rest of year	1154	1720



How many more summer tours for inside Canada were sold than summer tours for outside Canada?

Subtract 498 from 2675.

Show 2675 – 498 in vertical form and try to subtract ones.

$$\begin{array}{r} 2\,6\,7\,5 \\ -\;\;4\,9\,8 \\ \hline \end{array}$$

Cannot subtract 8 ones from 5 ones.

To subtract ones, regroup 7 tens, 5 ones as 6 tens, 15 ones and subtract.

$$\begin{array}{r} {\scriptstyle 6\ \ 15} \\ 2\,6\,\not{7}\,\not{5} \\ -\;\;4\,9\,8 \\ \hline \qquad\quad 7 \end{array}$$

To subtract tens, regroup 6 hundreds, 6 tens as 5 hundreds, 16 tens and subtract.

$$\begin{array}{r} {\scriptstyle\ \ 16} \\ {\scriptstyle 5\ \ \not{6}\ \ 15} \\ 2\,\not{6}\,\not{7}\,\not{5} \\ -\;\;4\,9\,8 \\ \hline \qquad 7\,7 \end{array}$$

Then, subtract hundreds and subtract thousands.

$$\begin{array}{r} {\scriptstyle\ \ 16} \\ {\scriptstyle 5\ \ \not{6}\ \ 15} \\ 2\,\not{6}\,\not{7}\,\not{5} \\ -\;\;4\,9\,8 \\ \hline 2\,1\,7\,7 \end{array}$$

The company sold 2177 more summer tours for inside Canada than for outside Canada.

Add to check:

$$\begin{array}{r} 2177 \\ +\;\;498 \\ \hline 2675 \end{array}$$

TRAVEL

to the next page for more work with subtraction.

Working Together

Regroup to show 10 more tens. Then complete the exercises.

1. 3524 − 462 = 2

2. 2746 − 1298 = 8

Regroup to show 10 more hundreds. Then complete the exercises.

3. 8247 − 3655 = 92

4. 15 520 − 1 875 = 45

Subtract by following the steps.

5.

55 157
− 37 324

Subtract.
Regroup and subtract.
Regroup and subtract.
Subtract.

Subtract.

6. 6243 − 3537

7. 7235 − 3846

8. 8151 − 6394

9. 32 109 − 5 123

Exercises

Subtract.

1. 3829 − 2378

2. 27 339 − 4 964

3. 9441 − 1542

4. 16 426 − 4 869

5. 7117 − 5929

6. 64 197 − 9 876

7. 27 060 − 17 236

8. 66 666 − 8 888

9. 8790 − 5272

10. 1691 − 749

11. 9149 − 6667

12. 13 098 − 1 729

13. 6342 − 1398

14. 9685 − 3889

15. 41 597 − 14 751

Remember, you can add to check your work.

Tours

	Inside Canada	Outside Canada
Summer	2675	498
Rest of year	1154	1720

Solve.

16. For the rest of the year, were more tours sold for outside or inside Canada? How many more?

17. How many fewer tours outside Canada were sold for the summer than for the rest of the year?

***18.** In all, were more tours sold for outside or for inside Canada? How many more?

***19.** In all, were more tours sold for the summer or for the rest of the year? How many more?

Practice

Subtract to decode the message.

A 7774 1796	C 9610 2012	D 9547 3589
E 8366 788	L 1353 395	N 6421 623
R 5432 4454	T 12 808 4 850	V 8255 2677

7958		7598
978		5978
5978		5798
5578		5978
7578		5958
958		5978

Subtract.

1. 4931 − 2907

2. 5385 − 3776

3. 18 204 − 5 841

4. 8352 − 3867

5. 77 275 − 29 637

6. 5120 − 669

7. 35 825 − 3 658

8. 3140 − 2798

9. 14 689 − 8 995

10. 8350 − 4973

11. 21 744 − 19 858

Some additions and subtractions are easier than they look.

For 375 + 298, think (375 + 300 = 675), then subtract 2. (673)

For 820 − 595, think (820 − 600 = 220), then add 5. (225)

Try to do these without using paper or pencil.

1. 287 + 594

2. 374 − 99

3. 625 + 297

4. 705 − 493

5. 139 + 692

6. 268 − 196

7. 377 + 485

8. 612 − 387

9. 468 + 375

10. 460 − 175

11. 1492 + 2950

12. 4635 − 1980

try this

Subtraction, Regrouping with Zeros

Mount Logan, the highest peak in Canada, is 6050 m (metres) above sea level.

How much higher is Mount Logan than Mount Robson?

Subtract 3954 from 6050.

Show 6050 − 3954 in vertical form and regroup to subtract ones.

$$\begin{array}{r} {\scriptstyle 4\ 10} \\ 6\,0\,\not{5}\,\not{0} \\ 3\,9\,5\,4 \\ \hline 6 \end{array}$$

To subtract tens, think of 6 thousands as 60 hundreds and regroup.

$$\begin{array}{r} {\scriptstyle 14} \\ {\scriptstyle 5\ 9\ \not{4}\ 10} \\ \not{6}\,\not{0}\,\not{5}\,\not{0} \\ 3\,9\,5\,4 \\ \hline 6 \end{array}$$

Then, subtract tens.

$$\begin{array}{r} {\scriptstyle 14} \\ {\scriptstyle 5\ 9\ \not{4}\ 10} \\ \not{6}\,\not{0}\,\not{5}\,\not{0} \\ 3\,9\,5\,4 \\ \hline 9\,6 \end{array}$$

Subtract hundreds. Subtract thousands.

$$\begin{array}{r} {\scriptstyle 14} \\ {\scriptstyle 5\ 9\ \not{4}\ 10} \\ \not{6}\,\not{0}\,\not{5}\,\not{0} \\ 3\,9\,5\,4 \\ \hline 2\,0\,9\,6 \end{array}$$

Mount Logan is 2096 m higher than Mount Robson.

Here are some other examples that show regrouping with zeros.

$$\begin{array}{r} {\scriptstyle 3\ 9\ 9\ 12} \\ \not{4}\,0\,0\,\not{2} \\ 1\,6\,7\,5 \\ \hline 2\,3\,2\,7 \end{array}$$

$$\begin{array}{r} {\scriptstyle 1\ 9\ 9\ 9\ 10} \\ 2\,0\,0\,0\,\not{0} \\ 1\,5\,2\,7\,6 \\ \hline 4\,7\,2\,4 \end{array}$$

$$\begin{array}{r} {\scriptstyle 12} \\ {\scriptstyle 2\ 9\ \not{3}\ 9\ 10} \\ 3\,0\,\not{3}\,0\,\not{0} \\ 2\,5\,8\,7 \\ \hline 2\,7\,7\,1\,3 \end{array}$$

Mount Robson, the highest peak in the Canadian Rockies, is 3954 m above sea level.

Working Together

Complete.

1. 3 9 9 9 ~~4 0 0 0 0~~
2. 10 ~~5 0 0 0~~
3. 12 ~~3 0 2~~ 6
4. ~~4~~ 9 ~~2 0 5 0 2~~

Complete the regrouping and the subtraction.

5. ~~6 0 0 0~~
   2 5 8 4
6. ~~1 0 0 3~~ 8
   5 2 9 0
   8

Subtract.

7. 4000
   1427
8. 30 000
   12 756

9. 7020 – 4827
10. 50 075 – 23 294

Exercises

Subtract.

1. 6000
   3267
2. 30 000
   13 614
3. 8002
   4955
4. 20 500
   17 815

5. 44 000 – 6 081
6. 7000 – 2472
7. 30 402 – 25 894
8. 20 055 – 3 878

Remember, you can add to check your work.

How much higher is Mount Logan than

9. Cirque Mountain (1573 m) in Newfoundland?
10. Mount Royal (233 m) in Quebec?
11. Barbeau Peak (2603 m) on Ellesmere Island in the Northwest Territories?
12. Mount Fairweather (4663 m) on the British Columbia border with Alaska?

Use *each* of the ten digits
0, 1, 2, 3, 4, 5, 6, 7, 8, 9
just one time in each of these:

1. Write the two numbers that have the greatest difference.
2. Write the two numbers that have the least difference.

PROBLEM SOLVING

Practice

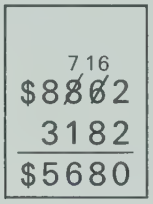
Subtract.

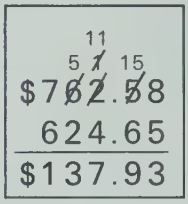
1. 7507 4633	**2.** 33 609 9 142	**3.** 47 439 37 766	**4.** 5341 3554	**5.** 69 350 16 894
6. 8000 4915	**7.** 70 000 30 718	**8.** 40 506 3 858	**9.** 8000 2234	**10.** 90 300 46 788

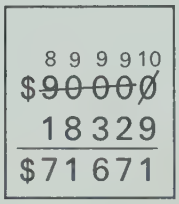
11. 5255 – 1628
12. 10 634 – 7 945
13. 65 811 – 37 559
14. 68 010 – 49 027
15. 2230 – 1761
16. 89 352 – 9 779
17. 41 000 – 16 964
18. 13 431 – 1 458
19. 7103 – 5784

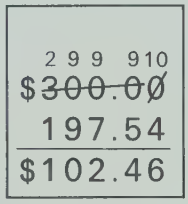
Amounts of money are subtracted just like whole numbers.

Examples:









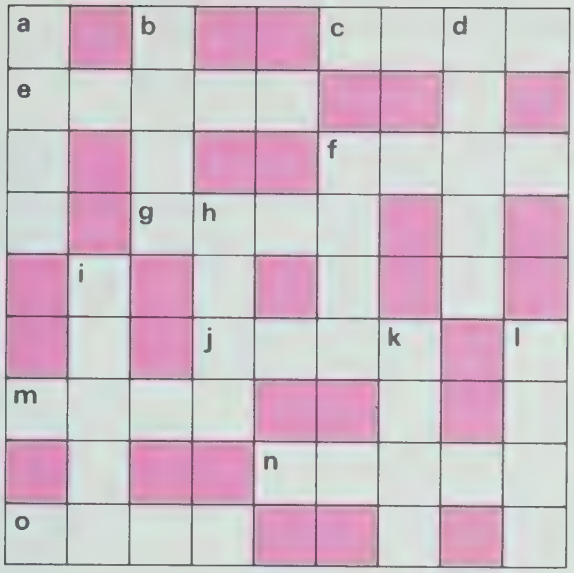
Subtract. Add to check.

20. $9392 – $2503
21. $46.32 – $40.84
22. $66 784 – $42 987
23. $265.21 – $35.53
24. $21 325 – $9 829
25. $100.00 – $64.30
26. $7000 – $6706
27. $501.01 – $56.67
28. $60 700 – $53 292

Use >, <, or = to make true statements.

29. 7906 – 1174 ◍ 9100 – 2728
30. 7984 – 3028 ◍ 3028 + 1937
31. $12 376 ◍ $32 166 – $19 790
32. 3292 + 4321 ◍ 9034 – 2321
33. 13 940 – 1 068 ◍ 12 872
34. $39.62 – $15.24 ◍ $23.48
35. 16 923 ◍ 9 733 + 9 890
36. $500.00 – $147.52 ◍ $352.48
37. 2518 + 1438 ◍ 5034 – 1438
38. $12 028 ◍ $20 000 – $7 918
39. 19 134 – 6 789 ◍ 12 345
40. 5784 – 1895 ◍ 1995 + 1895

Copy and complete the cross-number puzzle.



Across

c. 12 537 − 3 770
e. 28 069 + 37 387
f. 10 817 − 8 472
g. 6000 − 3899
j. 8371 − 7359
m. 4198 + 1234
n. 90 000 − 24 544
o. 9547 − 1869

Down

a. 10 300 − 2 622
b. 865 + 4567
d. 83 810 − 18 354
f. 5043 − 2942
h. 30 008 − 28 996
i. 28 577 + 36 879
k. 4003 − 1658
l. 9661 − 894

This chart shows the number of square kilometres in the provinces and territories.

Newfoundland	404 517	Saskatchewan		651 900
Prince Edward Island	5 657	Alberta		661 185
Nova Scotia	55 490	British Columbia		948 596
New Brunswick	73 437	Yukon		536 324
Quebec	1 540 680	Northwest Territories	Franklin	1 422 559
Ontario	1 068 582		Keewatin	590 932
Manitoba	650 087		Mackenzie	1 366 193

41. How much larger is British Columbia than Saskatchewan?

42. How many square kilometres are there in the three Maritime Provinces?

43. Two provinces are nearly equal in size. How much larger is one than the other?

44. Use the chart to make up a question to ask a classmate.

Estimating the Difference

There are
650 087 km^2
in Manitoba.

101 592 km^2
are covered
with water.

About how many
square kilometres
of land are
in Manitoba?

Round and subtract.

$$\begin{array}{rcr} 650\,087 & \longrightarrow & 650\,000 \\ 101\,592 & \longrightarrow & \underline{100\,000} \\ & & 550\,000 \end{array}$$

There are about
550 000 km^2 of land
in Manitoba.

For the exact amount of land,
subtract in the usual way.

$$\begin{array}{r} {\scriptstyle 4\ 9\ \ 918} \\ 6\cancel{50}\,\cancel{08}7 \\ \underline{101\,592} \\ 548\,495 \end{array}$$

There are 548 495 km^2
of land in Manitoba.

Working Together

Round to the nearest ten thousand.

1. 22 900 **2.** 38 250

Round to the nearest thousand.

3. 4835 **4.** 27 376

Round to the nearest ten thousand. Subtract to estimate the difference.

5. 82 360 – 29 184

6. 58 192 – 11 779

Round to the nearest thousand. Subtract to estimate the difference.

7. 7495 – 3266

8. 47 915 – 25 087

Complete the chart.

		Estimate	Exact difference
9.	12 126 – 4 892	?	?
10.	35 690 – 19 275	?	?

Exercises

Round and subtract to estimate each difference. Then find the exact difference.

1. 9163 − 3748

2. 6272 − 4159

3. 29 116 − 21 082

4. 4833 − 3917

5. 9726 − 2150

6. 21 970 − 14 038

7. 11 784 – 6 118

8. 88 056 – 59 894

9. 67 682 – 9 724

10. 7854 – 2799

11. 23 097 – 14 523

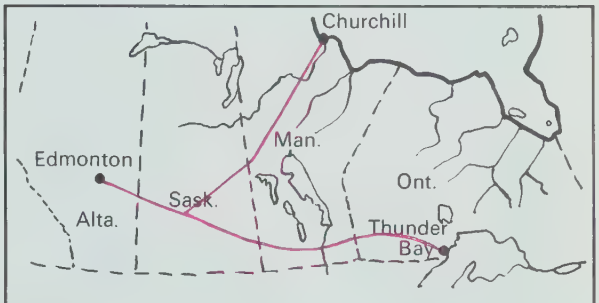
12. 31 235 – 8 477

13. 27 954 – 25 326

14. 39 857 – 38 905

15. 47 804 – 15 682

16. 2813 – 2782



From Edmonton it is 1887 km by train to Churchill and then 4668 km by ship to England.

Also, it is 1953 km by train to Thunder Bay and then 6454 km by ship to England.

Which route would be faster for shipping things from Edmonton to England

1. in August? **2.** in November?

3. in February?

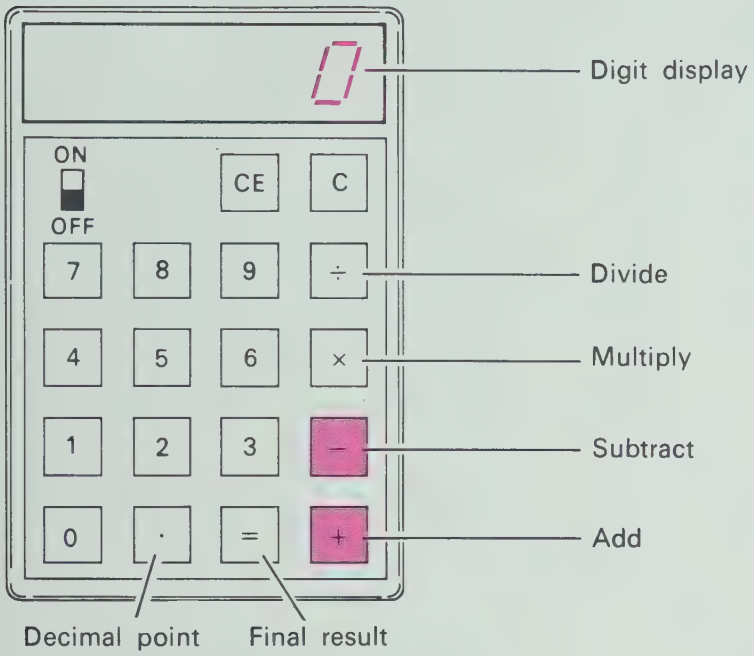
4. today?

PROBLEM SOLVING

The [+] and [−] Keys on a Calculator

People who know how to work with numbers can use a calculator to save them time and effort.

To use a calculator, you need to know which keys to press.



Calculator keys are not always in the same place on different calculators.

Tell which red key you would use to find each of these.

1. 4398 + 1978

2. 23 846 − 17 248

3. the difference of 5 375 and 26 849

4. the sum of 59 848 and 26 973

5. the cost of the items in your grocery basket

6. how much you will have left in your bank account after you make a withdrawal

7. the number of people who went to the fair in all when you know the number for each day

8. how many more or how many fewer people went to the fair today than yesterday

9. how many more square kilometres there are in Alberta than in Saskatchewan

10. how many square kilometres there are in Canada when you know the number in each province and territory

*__11.__ how many fewer people live in the provinces east of Quebec than in Quebec itself when you know the population of each province

Calculator

Situations That Affect Answers

An answer sometimes depends upon the situation.
What other answers are possible for Kit?

I have $75 saved and I will earn more money this week. Which bicycle should I get?

If I earn $25 this week, I can get the DeLuxe Bicycle.

BICYCLE SALE

This Week Only!

DeLuxe Bicycle $99.99 Sale! ~~$115.00~~

Super Bicycle $89.99 Sale! ~~$99.00~~

Standard Bicycle $79.99 Sale! ~~$84.00~~

Different answers are possible for each of these.
Tell how different situations would affect the answers.

1. What postage stamps can you buy with one dollar?
2. How long does it take to go from Calgary to Vancouver?
3. How many hamburgers should we make for lunch?
4. How long should the table legs be?
5. How big should we make the boat?
6. How much sand should be put into the bag?
7. What shape should we cut out of the cardboard?
8. How big should we make the opening in the birdhouse?
9. How many pages will you read today?

PROBLEM SOLVING

Checking Up

Add.

1. 7345 + 2651

2. 16 942 + 23 016

3. 1083 + 8561

4. 21 541 + 13 935

5. 2494 + 3046

6. 35 261 + 42 787

7. 2587 + 4739

8. 57 642 + 4 685

9. \$9346 + 1755

10. \$19 675 + 47 785

11. \$21.83 + 26.59

12. \$267.83 + 75.82

13. 2504 + 635 + 3071

14. 3 438 + 12 607 + 14 869

15. 14 372 + 21 143 + 12 486

16. 2 987 + 11 635 + 13 753 + 22 717

17. 4 953 + 14 983

18. \$60 936 + \$3 684

19. 13 574 + 2 398 + 45 463

20. \$131.56 + \$257.43 + \$23.31

Subtract.

21. 9682 − 7471

22. 19 658 − 16 213

23. 8267 − 6834

24. 34 577 − 12 097

25. 6237 − 3908

26. 44 189 − 37 452

27. 5133 − 3765

28. 62 180 − 45 921

29. \$7911 − 5242

30. \$44 444 − 24 865

31. \$175.48 − 87.91

32. \$576.60 − 258.69

33. 8000 − 3832

34. 90 000 − 65 205

35. 10 050 − 5 983

36. 42 003 − 10 166

37. 7353 − 1570

38. 92 209 − 47 862

39. \$30 030 − \$24 798

40. \$180.02 − \$11.34

41. 9765 adults and 14 288 children visited the park in May. What was the total number of visitors to the park in May?

42. The contest had 35 500 entries and 1750 prizes. How many more entries than prizes were there?

3 MULTIPLICATION

Basic Facts

How many red checkers are there?

3 rows, 4 in each row

$3 \times 4 = 12$

There are 12 red checkers.

How many checkers are there?

6 rows, 4 in each row

$6 \times 4 = 24$

There are 24 checkers.

How many squares are on the checkerboard?

8 rows, 8 in each row

$8 \times 8 = 64$

factor factor product

There are 64 squares on the checkerboard.

Working Together

Make a chart and list the multiples.

A **multiple** of a number is the product of that number and any other number.

	0	1	2	3	4	5	6	7	8	9
1. 0 ×			0							
2. 1 ×			2							
3. 2 ×			4							
4. 3 ×			6							
5. 4 ×			8							
6. 5 ×			10							
7. 6 ×			12							
8. 7 ×			14							
9. 8 ×			16							
10. 9 ×			18							

Exercises

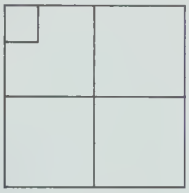
Multiply.

1. 2×3	**2.** 4×5	**3.** 5×1
4. 2×0	**5.** 5×3	**6.** 4×2
7. 2×6	**8.** 1×3	**9.** 0×4
10. 3×3	**11.** 2×7	**12.** 6×3
13. 7×1	**14.** 6×0	**15.** 2×9
16. 8×6	**17.** 4×9	**18.** 9×3
19. 9×7	**20.** 6×6	**21.** 3×8
22. 7×4	**23.** 5×8	**24.** 4×6
25. 6×8	**26.** 3×6	**27.** 9×5
28. 8×4	**29.** 7×7	**30.** 9×4

Write the ten products for each column. Which column can you do the fastest?

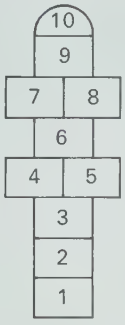
31.	**32.**	**33.**
2×4	0×0	7×8
3×2	1×1	8×7
8×3	2×2	9×6
7×5	3×3	6×9
6×4	4×4	9×8
9×2	5×5	8×9
5×6	6×6	6×7
3×7	7×7	7×6
4×8	8×8	7×9
2×8	9×9	9×7

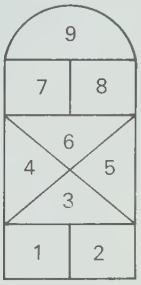
This is the diagram for an outdoor game called Four Square.



1. How many squares can you find in the four-square diagram?

These are diagrams for an outdoor game called Hopscotch.

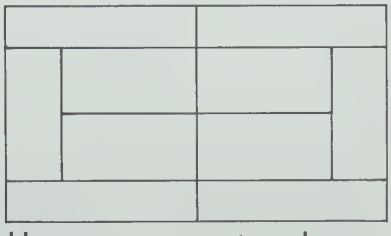




2. How many rectangles can you find in this diagram?

3. How many triangles can you find in this diagram?

This is the diagram of a tennis court.



4. How many rectangles can you find in the diagram?

5. How many squares can you find in a checkerboard?

try this

Multiplying a Two-Digit Number by a One-Digit Number

3 school buses are used for the field trip. Each bus will carry 57 children. How many children will the buses carry in all?

Multiply 3 and 57.

tens	ones
5	7
	3
2	1

$3 \times 7 = 21$

or 2 tens 1 one.

	tens	ones
	2	
	5	7
		3
		1

	5	7
		3
	2	1
1	5	0

3×5 tens $= 15$ tens

and 2 more tens make 17 tens.

	2	
	5	7
		3
1	7	1

This is the standard form for multiplying.

	5	7
		3
	2	1
1	5	0
1	7	1

Add.

The standard form is one of the fastest ways I can multiply using a pencil.

The buses will carry 171 children in all.

Working Together

Show each multiplication in standard form.

Example: 63×8 becomes $^{2}63 \times 8$

$$\begin{array}{r} 63 \\ \times\ 8 \\ \hline 24 \\ 480 \\ \hline 504 \end{array} \qquad \begin{array}{r} {}^{2}63 \\ \times\ 8 \\ \hline 504 \end{array}$$

1. $34 \times 2 = 68$ **2.** $52 \times 6 = 312$ **3.** $49 \times 9 = 441$

Multiply. Use the standard form.

4. 42×3 **5.** 38×4 **6.** 45×7

Exercises

Multiply. Use the standard form.

1. 21×4 **2.** 72×2 **3.** 40×6

4. 62×7 **5.** 68×6 **6.** 25×5

7. 83×4 **8.** 52×9 **9.** 49×8

10. 87×9 **11.** 29×7 **12.** 16×8

13. 2×23 **14.** 4×72

15. 3×84 **16.** 5×37

17. 8×77 **18.** 3×38

19. 7×38 **20.** 9×79

21. 5×74 **22.** 6×99

Solve.

23. The buses will travel 48 km each way on the field trip. How long is the round trip?

24. What will the total distance be for all 3 buses?

25. How many children could go on the field trip in 4 buses?

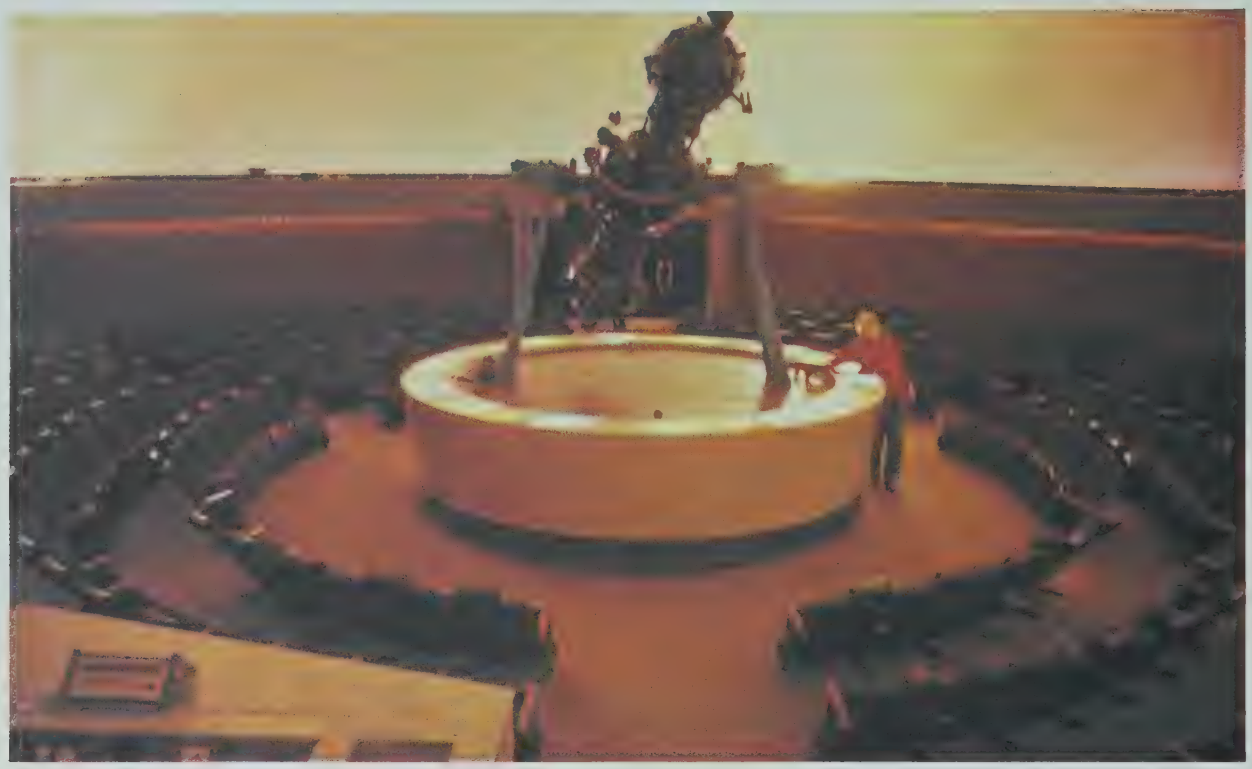
26. How many children could go on the field trip in 7 buses?

*__27.__ 6 teachers or their helpers ride each bus with 57 children. How many people are going on the field trip in all 3 buses?

*__28.__ If 57 children and 6 adults are driven on the field trip in each of 4 buses, how many people would be on the buses in all?

Multiplying by a One-Digit Number

The planetarium can hold 354 people for each show. On Saturday there are 6 shows. How many people can see a planetarium show on Saturday?



Multiply 6 and 354.

$$\begin{array}{r} {\scriptstyle 2} \\ 3\,5\,4 \\ 6 \\ \hline 4 \end{array}$$

6 × 4 = 24 or 2 tens 4 ones.

$$\begin{array}{r} {\scriptstyle 3}\;{\scriptstyle 2} \\ 3\,5\,4 \\ 6 \\ \hline 2\,4 \end{array}$$

6 × 5 tens = 30 tens. 2 more tens make 32 tens or 3 hundreds 2 tens.

$$\begin{array}{r} {\scriptstyle 3}\;\;{\scriptstyle 2} \\ 3\,5\,4 \\ 6 \\ \hline 2\,1\,2\,4 \end{array}$$

6 × 3 hundreds = 18 hundreds. 3 more hundreds make 21 hundreds or 2 thousands 1 hundred.

2124 people can see a planetarium show on Saturday.

Working Together

Complete each multiplication.

1. $47 \times 5 = 23\square$ **2.** $36 \times 7 = \square\square 2$ (4) **3.** $63 \times 4 = \square\square\square$ **4.** $2830 \times 3 = \square\square 90$ **5.** $134 \times 6 = 8\square\square$ **6.** $3271 \times 8 = \square\square\square 8$

Multiply.

7. 75×4 **8.** 684×5 **9.** 2604×3 **10.** 9431×9 **11.** $16\,938 \times 6$ **12.** $40\,536 \times 8$

Exercises

Multiply.

1. 59×5 **2.** 34×7 **3.** 87×6

4. 678×9 **5.** 951×7 **6.** 606×6

7. 1231×3 **8.** 4003×5 **9.** 4625×8

10. $20\,968 \times 4$ **11.** $27\,879 \times 3$

12. $72\,342 \times 7$ **13.** $17\,727 \times 9$

14. 8×941 **15.** 6×9214

16. 9×17 **17.** $2 \times 47\,216$

18. 4×634 **19.** 8×5764

20. 5×712 **21.** $4 \times 17\,819$

22. 9×5555 **23.** $7 \times 76\,008$

24. 8×880 **25.** 4×9052

26. 3×5226 **27.** $6 \times 10\,375$

28. 2×9999 **29.** $5 \times 19\,753$

Solve.

30. There are 3 planetarium shows Saturday evening. How many people can see these shows?

31. The planetarium has a special show each weekday afternoon. How many people can see this show from Monday to Friday?

32. The school auditorium can hold 1250 people. How many people can see the 3 performances of the school play?

33. The football stadium in Vancouver holds 32 752 people. How many people can go to 8 Canadian Football League games there in a season?

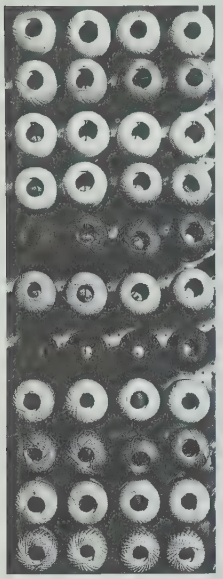
34. The Montreal Forum holds 18 350 people for hockey. How many people can watch 4 Stanley Cup games in the Forum?

35. The baseball stadium in Toronto can hold 46 500 people. How many people can watch a 3-game series in the stadium?

Practice

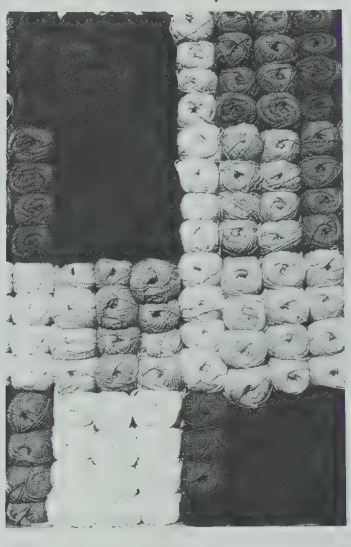
Use multiplication to help you answer the questions.

1. How many balls of crochet cotton are there?

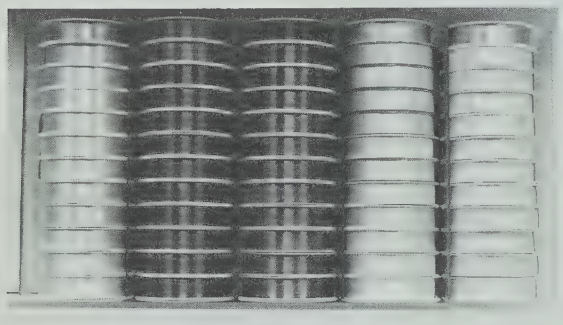


11 rows,
4 in
each row

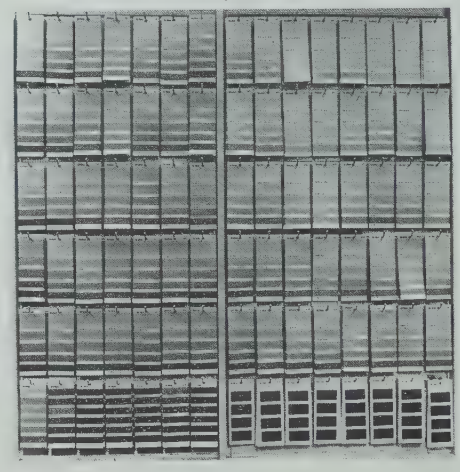
2. How many balls of wool are there?



3. How many spools are there?

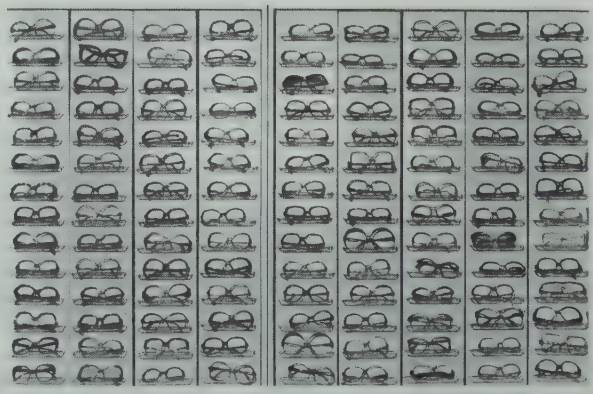


4. How many cards are there?



5. How many shoes are there?

6. How many pairs of glasses are there?



Amounts of money are multiplied just like whole numbers.

Examples:

4 2 1	1	6 6 3
$3 742	$5.40	$19.95
6	3	7
$22 452	$16.20	$139.65

Mrs. Burton bought winter clothes for her 3 sons.

7. Each hat cost $4.99. How much did 3 hats cost?

8. Each coat cost $23.89. How much did 3 coats cost?

9. Each pair of boots cost $11.47. How much did 3 pairs of boots cost?

10. Mrs. Burton bought 2 pairs of socks for each boy. Each pair cost $1.49. How much did the socks cost?

Multiply.

11. 7 × 273
12. 5 × 8478
13. 4 × 8526
14. 4 × $47.88
15. 5 × $295
16. 9 × 30 894
17. 2 × 58 390
18. 7 × 5185
19. 3 × 4477
20. 3 × $8592
21. 9 × $3.03
22. 6 × 73 195
23. 8 × 13 279
24. 8 × 1250

Replace each ■ with a digit to show a multiplication. Do not use the same digit more than once in each exercise.

Example:

For	use
■	3
■	2
■	6

1. ■ ■ / ■■

2. ■■ ■ / ■■

3. ■■ ■ / ■■■

4. ■■■ ■ / ■■■

5. ■■■ ■ / ■■■■

6. ■■■■ ■ / ■■■■

7. ■■■■ ■ / ■■■■■

The farther you go, the harder they get. How many can you do?

try this

Multiplying by Multiples of 10, 100, and 1000

The stamp store set up a "Grab Bag Bin". It put 175 different stamps into each bag and filled 300 bags for the bin. How many stamps did it put into the grab bags?

Multiply 300 and 175.

For the product

$$\begin{array}{r} 175 \\ \times\ 300 \\ \hline \end{array}$$

3 hundreds 0 tens 0 ones

you need to know how to multiply 0 and 175,

$$\begin{array}{r} 175 \\ \times\ 300 \\ \hline 0 \end{array}$$

When 0 is a factor, the product is 0.

$$\begin{array}{r} 175 \\ \times\ 300 \\ \hline 00 \end{array}$$

$0 \times 175 = 0$

0 tens $\times$ 175 = 0 tens

and how to multiply 3 and 175.

3 hundreds $\times$ 175 = 525 hundreds or 52 thousands 5 hundreds.

$$\begin{array}{r} {\scriptstyle 2\ \ 1} \\ 175 \\ \times\ 300 \\ \hline 52500 \end{array}$$

The stamp store put 52 500 stamps into the grab bags.

Working Together

Use the first statement to help you complete the others.

1. $4 \times 17 = 68$ | 4 tens × 17 = ▢ tens | 4 hundreds × 17 = ▢ hundreds
40 × 17 = ▢ | 400 × 17 = ▢

2. $6 \times 39 = 234$ | 6 tens × 39 = ▢ tens | 6 hundreds × 39 = ▢ hundreds
60 × 39 = ▢ | 600 × 39 = ▢

3.

453	453	453	453	453
9	9 hundreds	900	9 thousands	9 000
4077	▢ hundreds	▢00	▢ thousands	▢000

Write 0 in the ones place. Then multiply by 7 (tens).

4. 28 × 70 = ▢

5. 369 × 70

Write 0 in the ones and tens places. Then multiply by 3 (hundreds).

6. 128 × 300

7. 709 × 300

Multiply.

8. 276 × 20

9. 784 × 500

Exercises

Multiply.

1. 46 × 30

2. 141 × 20

3. 163 × 500

4. 695 × 60

5. 108 × 800

6. 942 × 700

7. 70×53

8. 200×17

9. 50×47

10. 900×141

11. 142×60

12. 75×80

13. 36×4000

14. 2000×358

Study these multiplication sentences.

$3 \times 10 = 30$	$7 \times 100 = 700$	$4 \times 1000 = 4\,000$
$28 \times 10 = 280$	$35 \times 100 = 3\,500$	$79 \times 1000 = 79\,000$
$10 \times 65 = 650$	$100 \times 35 = 3\,500$	$1000 \times 64 = 64\,000$
$429 \times 10 = 4290$	$631 \times 100 = 63\,100$	$152 \times 1000 = 152\,000$

Give a rule that helps you find the product when

1. 10 is a factor. **2.** 100 is a factor. **3.** 1000 is a factor.

Make up some multiplication exercises and test your rule.

try this

Multiplying a Two-Digit Number by a Two-Digit Number

When the puzzle is put together there are 36 rows with 42 pieces in each row. Are there more than 1500 pieces in the puzzle?

Multiply 36 and 42.

For the product

$$\begin{array}{r} 42 \\ \times\ 36 \\ \hline \end{array}$$

3 tens 6 ones

you need to know how to multiply 6 and 42,

$$\begin{array}{r} {\scriptstyle 1} \\ 42 \\ \times\ 36 \\ \hline 252 \end{array}$$

You do not have to write this numeral if you can remember it.

and how to multiply 3 and 42.

$$\begin{array}{r} 42 \\ \times\ 36 \\ \hline 252 \\ 1260 \end{array}$$

3 tens × 42 = 126 tens or 1260.

Then add.

$$\begin{array}{r} 42 \\ \times\ 36 \\ \hline 252 \\ 1260 \\ \hline 1512 \end{array}$$

There are more than 1500 pieces in the puzzle.

You can change the order of the factors to check your work.

$$\begin{array}{r} 36 \\ \times\ 42 \\ \hline 72 \\ 1440 \\ \hline 1512 \end{array}$$

If this result does not match the first result, there is a mistake in your work.

Working Together

Multiply by following the steps.

1.

$$\begin{array}{r} 27 \\ \underline{32} \end{array}$$

Multiply 2 and 27. → 0

Write 0 in the ones place.
Multiply 3 (tens) and 27.
Add.

2.

$$\begin{array}{r} 84 \\ \underline{96} \end{array}$$

Multiply 6 and 84. → —

Write 0 in the ones place.
Multiply 9 (tens) and 84.
Add.

Multiply. Change the order of the factors to check your work.

3. $\begin{array}{r} 37 \\ \underline{26} \end{array}$ **4.** $\begin{array}{r} 46 \\ \underline{72} \end{array}$ **5.** $\begin{array}{r} 97 \\ \underline{85} \end{array}$

Exercises

Multiply. Change the order of the factors to check your work.

1. $\begin{array}{r} 37 \\ \underline{45} \end{array}$ **2.** $\begin{array}{r} 41 \\ \underline{87} \end{array}$ **3.** $\begin{array}{r} 59 \\ \underline{63} \end{array}$

4. $\begin{array}{r} 25 \\ \underline{93} \end{array}$ **5.** $\begin{array}{r} 84 \\ \underline{44} \end{array}$ **6.** $\begin{array}{r} 83 \\ \underline{78} \end{array}$

7. 78×56 **8.** 92×98

9. 54×89 **10.** 55×52

11. 65×68 **12.** 48×25

13. 31×84 **14.** 73×92

How many pieces are in each of these jigsaw puzzles?

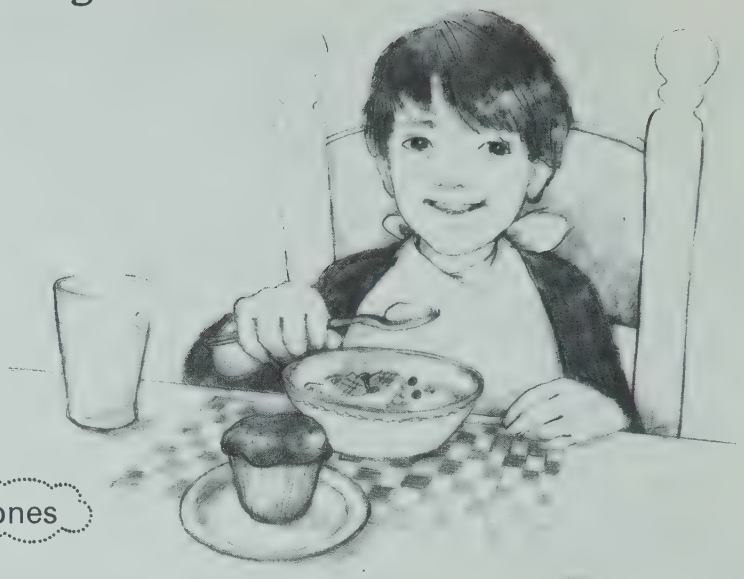
15. 22 rows with 34 pieces in each row

16. 28 rows with 28 pieces in each row

Multiplying by a Two-Digit Number

About how many breakfasts will Mike eat if he eats one each day for 75 years?

Most years have 365 d (days).



Multiplying 75 and 365 will give *about* how many times Mike will eat breakfast.

For the product

$$\begin{array}{r} 365 \\ \times\ 75 \\ \hline \end{array}$$

7 tens 5 ones

you need to know how to multiply 5 and 365, and how to multiply 7 and 365. Then add.

$$\begin{array}{r} {\scriptstyle 3\ \ 2} \\ 365 \\ \times\ 75 \\ \hline 1825 \end{array}$$

$$\begin{array}{r} {\scriptstyle 4\ \ 3} \\ 365 \\ \times\ 75 \\ \hline 1825 \\ 25550 \\ \hline \end{array}$$

7 tens × 365 = 2555 tens or 25 550.

$$\begin{array}{r} 365 \\ \times\ 75 \\ \hline 1825 \\ 25550 \\ \hline 27375 \end{array}$$

Mike will eat about 27 375 breakfasts in 75 years.

Working Together

Multiply by following the steps.

1. $\begin{array}{r} 1548 \\ \times\ 26 \\ \hline \end{array}$

Multiply 6 and 1548. →
Write 0 in the ones place.
Multiply 2 (tens) and 1548.
Add. →

Multiply.

2. $\begin{array}{r} 278 \\ \times\ 32 \\ \hline \end{array}$

3. $\begin{array}{r} 3459 \\ \times\ 27 \\ \hline \end{array}$

4. 83×296

5. 94×6857

6. $26 \times 42 \times 38$

Exercises

Multiply.

1. 376 28	**2.** 1473 95	**3.** 83 36	**4.** 406 78	**5.** 4592 43
6. 583 64	**7.** 637 26	**8.** 6205 55	**9.** 5224 74	**10.** 195 37

11. 56×789 **12.** 39×6437 **13.** 27×58

14. 47×3197 **15.** 49×863 **16.** 86×6407

17. $24 \times 17 \times 53$ **18.** $25 \times 75 \times 16$ **19.** $27 \times 38 \times 37$

Solve. Use the table on page 342 if needed.

20. How many hours are there in a year?

21. How many hours are there in a leap year?

22. How many minutes are there in October?

23. How many seconds are there in a day?

24. How many months are there in 75 years?

25. How many more days are there in a year than in 52 weeks?

*__26.__ How many hours are there in each month?

*__27.__ How many days are there in a **century**?

28. The light bulb was supposed to last for 1000 h (hours). It burned 24 h each day for 45 d. Did it last for 1000 h?

29. Mr. Hill said that he watches television about 19 h each week. About how many hours will that be in a year?

The office manager has to buy the office supplies.

One package of typing paper is used in the office each day.

The office is open from Monday to Friday except on 10 holidays during the year.

1. How many packages of typing paper should the office manager buy for next year?

PROBLEM SOLVING

Multiplying by a Three-Digit Number

To estimate the number of telephone numbers in the Toronto telephone book, Luisa counted the numbers in one column and multiplied by the number of columns on the page.

```
 1 0 9    in one column
     4    columns on the page
-------
 4 3 6    numbers on the page
```

Then she multiplied 436 by the number of pages that listed telephone numbers.

1971 pages with numbers . . .
Multiply 436 and 1971.

For the product

```
 1 9 7 1
     4 3 6
-------
```

you need to know how to multiply 6 and 1971,

```
  5  4
 1 9 7 1
     4 3 6
-------
 1 1 8 2 6
```

how to multiply 3 (tens) and 1971,

```
  2  2
 1 9 7 1
     4 3 6
-------
 1 1 8 2 6
 5 9 1 3 0
```

and how to multiply 4 (hundreds) and 1971.

```
  3  2
 1 9 7 1
     4 3 6
-------
 1 1 8 2 6
 5 9 1 3 0
 7 8 8 4 0 0
```

Then add.

```
   1 9 7 1
     4 3 6
-------
   1 1 8 2 6
   5 9 1 3 0
 7 8 8 4 0 0
-------
 8 5 9 3 5 6
```

The product is 859 356, but Luisa rounded her result and said:

There are about 860 000 telephone numbers in the Toronto telephone book.

Working Together

Multiply by following the steps.

1.

416
235

Multiply 5 and 416. →
Write 0 in the ones place.
Multiply 3 (tens) and 416. →
Write 0 in the ones and tens places.
Multiply 2 (hundreds) and 416. →
Add. →

Multiply.

2. 478 × 263

3. 3846 × 352

4. 723 × 219

5. 186 × 24 × 359

Exercises

Multiply.

1. 759 × 384

2. 665 × 597

3. 6842 × 196

4. 8006 × 348

5. 737 × 599

6. 518 × 4231

7. 667 × 3072

8. 749 × 458

9. 9 × 87 × 2732

10. 35 × 265 × 19

Follow Luisa's steps.

11. Estimate how many telephone numbers are in your phone book.

Estimate.

12. How many pages of telephone numbers are in this stack of Toronto phone books?

1. In your class, whose telephone number has digits having the greatest sum?

2. Whose number do you think takes the longest time to dial?

PROBLEM SOLVING

Practice

How many pieces are in this jigsaw puzzle?

11 rows, 57 pieces in each row

1.

Which box most likely belongs to each puzzle?

2. 65 rows, 35 pieces in each row
3. 49 rows, 51 pieces in each row
4. 43 rows, 57 pieces in each row

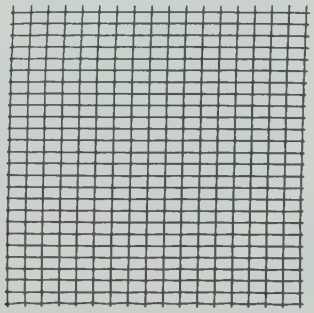
A

B

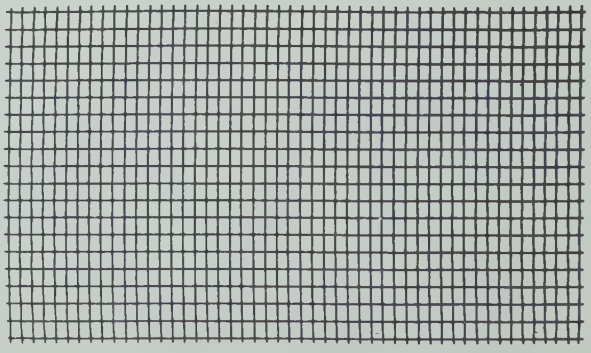
C

How many holes are in each piece of screen?

5.



6.



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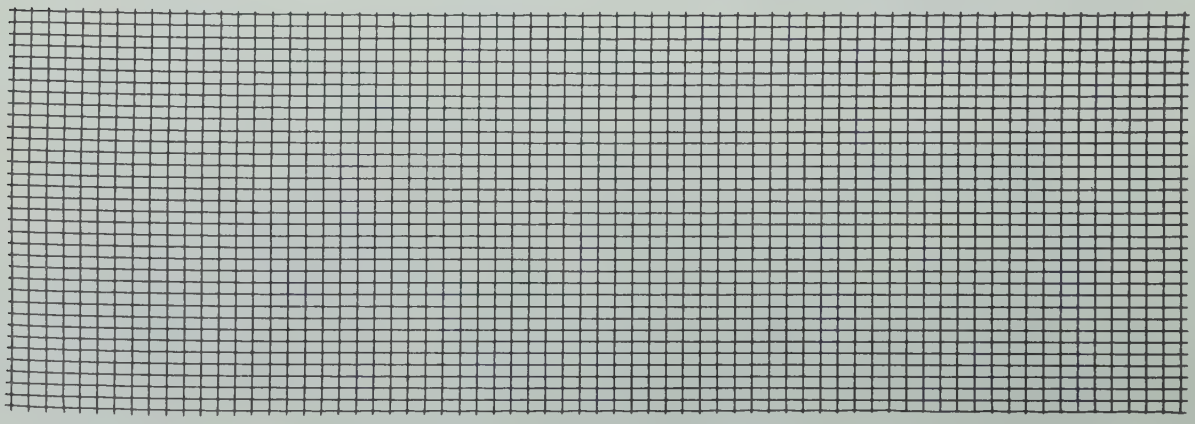
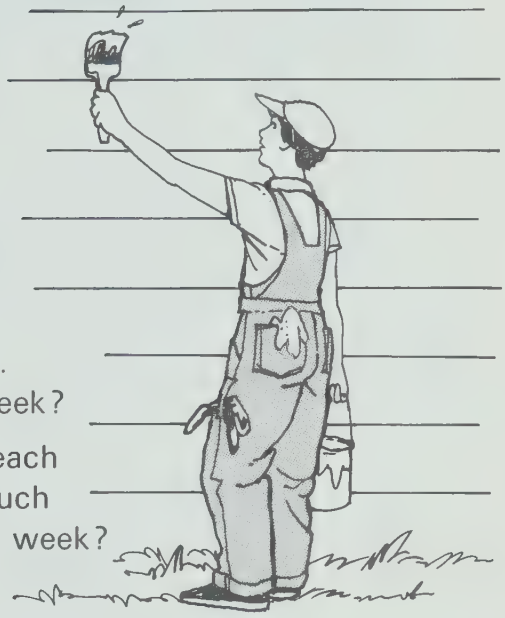


Amounts of money are multiplied just like whole numbers.

Examples:

\$3 285	\$193	\$8.13	\$28.56
64	438	129	753
13 140	1 544	73 17	85 68
197 100	5 790	162 60	1 428 00
\$210 240	77 200	813 00	19 992 00
	\$84 534	\$1048.77	\$21 505.68

Solve.



8. The painter earned \$8.50 for each hour it took to paint the house. It took 24 h. How much did the painter earn?

9. The plumber worked 125 h one month. The plumber earned \$13.25 for each hour. How much did the plumber earn?

10. The factory worker earns \$6.75 each hour. How much would be earned in a 40 h week?

*__11.__ The factory worker earns twice as much each hour for any *overtime* after 40 h. How much would be earned for 48 h of work in one week?

Multiply.

12. 74	**13.** 509	**14.** \$744	**15.** 9486	**16.** 1007	**17.** \$9.56
76	69	582	676	36	215

18. 79 × 643 **19.** 85 × \$3268 **20.** 42 × \$6.41

21. 625 × 392 **22.** 189 × \$6325 **23.** 789 × \$72.86

1. The first 3 min (minutes) cost \$2.80. Each extra minute costs 80¢. How much would 15 min cost?

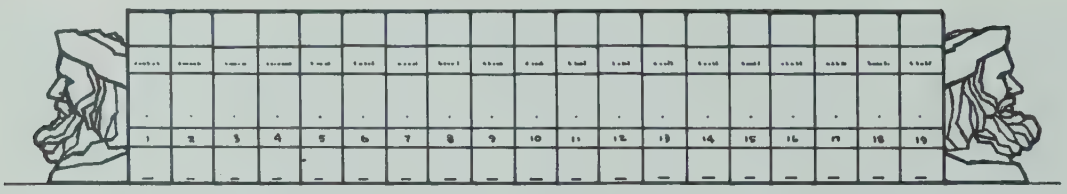
2. The first 3 min cost \$7.35. Each extra minute costs \$2.45. How much would 8 min cost?

3. Look in your telephone book. Can you find how much a 5 min call to Montreal would cost?

PROBLEM SOLVING

Estimating the Product

There are 19 books in the encyclopedia.
Each book has 832 pages. About how many pages are there in the encyclopedia?



To estimate the product of 19 and 832,

round 832 → 800
and round 19 → 20
then multiply. → 16 000

For the exact product, multiply in the usual way.

$$\begin{array}{r} 832 \\ \times\ 19 \\ \hline 7\,488 \\ 8\,320 \\ \hline 15\,808 \end{array}$$

There are about 16 000 pages in the encyclopedia.

Working Together

Round to the nearest hundred.

1. 482 **2.** 209 **3.** 650

Round to the nearest thousand.

4. 5495 **5.** 912 **6.** 3710

Study these multiplication examples.

$$\begin{array}{r} 60 \\ \times\ 40 \\ \hline 2400 \end{array} \qquad \begin{array}{r} 700 \\ \times\ 30 \\ \hline 21\,000 \end{array} \qquad \begin{array}{r} 5000 \\ \times\ 600 \\ \hline 3\,000\,000 \end{array}$$

7. Give a rule for multiplying when the only digit not 0 in each factor is the one on the left.

Round and multiply to estimate the product.

8. $\begin{array}{r} 68 \\ \times\ 82 \end{array}$ **9.** $\begin{array}{r} 309 \\ \times\ 75 \end{array}$ **10.** $\begin{array}{r} 6824 \\ \times\ 198 \end{array}$

Exercises

Round and multiply to estimate the product. Then find the exact product.

1. $\begin{array}{r} 84 \\ \times\ 78 \end{array}$ **2.** $\begin{array}{r} 482 \\ \times\ 71 \end{array}$ **3.** $\begin{array}{r} 674 \\ \times\ 841 \end{array}$

4. $\begin{array}{r} 1257 \\ \times\ 293 \end{array}$ **5.** $\begin{array}{r} 756 \\ \times\ 542 \end{array}$ **6.** $\begin{array}{r} 928 \\ \times\ 41 \end{array}$

7. 77×126 **8.** 948×4735

9. 67×97 **10.** 225×958

Estimate the total number

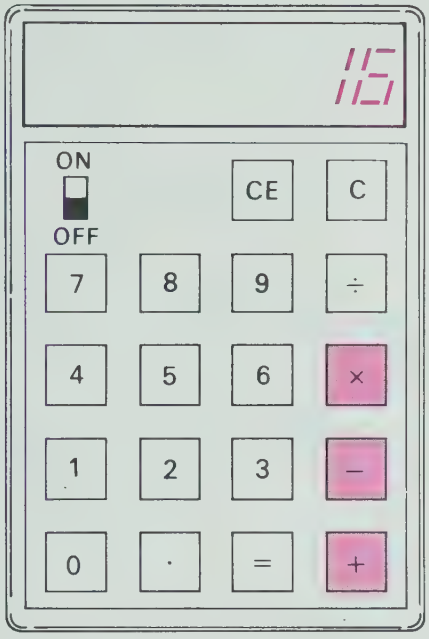
11. of eggs in 425 cartons, when each carton holds three dozen eggs.

12. of days in 1980 years.

13. of pages in all the copies of this book used by your class.

Keycharts and the [+] , [−] , and [×] Keys

To use a calculator you need to know which keys to press and the order in which to press them.



Sue bought 16 packages of beads. Each package had 144 beads. She used 1575 beads in the belts and bracelets she made. How many beads did she have left?

I have to multiply, then subtract.
. . . [×] , then [−]

To show which keys to use to solve this problem, Sue made a **keychart**.

From left to right this keychart shows the keys to press.

16	×	144	−	1575	=	___

Make a keychart that shows how to solve each of these.

1. 975 people went to the afternoon show. 1368 went to the evening show. How many went to both shows?

2. The machine planted 175 seeds in each of the 125 rows. How many seeds were planted?

3. 18 girls and 17 boys are in each class. How many girls and boys are in 16 classes?

4. Each page has 3 lists with 75 names on each list. How many names are listed on 45 pages?

5. The car sells for $4150, but it is on sale for $875 less. Tax on the sale price is $262. How much would you have to pay for the car?

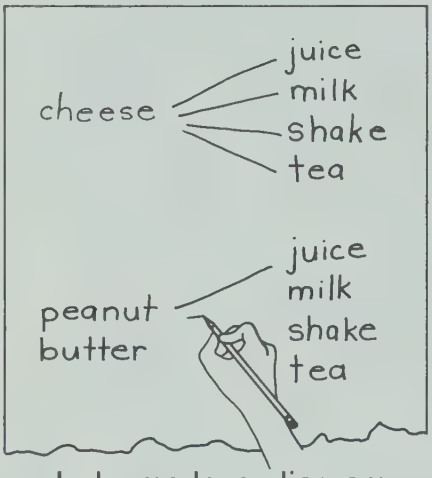
6. How many days are there in the last six months of the year?

Can you solve each problem?

Calculator

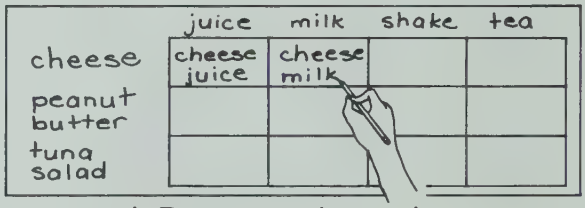
Finding the Number of Possibilities

To think about the possible choices of a sandwich and a drink . . .



. . . Judy made a diagram . . .

LUNCH ORDER FORM	
SANDWICH (Choose one)	DRINK (Choose one)
cheese	juice
peanut butter	milk
tuna salad	shake
	tea
Each order will include 1 apple and 2 cookies.	



. . . and Roger made a chart.

The chart and the diagram will both show that there are 12 ways to choose a sandwich and a drink.

1. Complete Judy's diagram.

2. Complete Roger's chart.

Draw a diagram or a chart that shows the different ways

3. the club election could turn out when Agnes, Beth, Charles, Doug, and Ellen are running for president and Frank, Gary, and Helen are running for vice-president.

How many president and vice-president pairs are possible?

4. the faces of two dice could turn up.

How many number pairs are possible?

5. one of the adjectives: jolly, angry, silly, friendly, foolish, bashful, or gentle, could be paired with one of the nouns: rabbit, elf, boy, or giant.

How many word pairs are possible?

6. you could choose two different letters of the alphabet so that the second one is a vowel.

How many letter pairs are possible?

PROBLEM SOLVING

Can you give a rule that tells how to find the number of pairs without drawing a chart or diagram?

Checking Up

Multiply.

1. 32 × 4	**2.** 87 × 7	**3.** 319 × 6	**4.** 684 × 2	**5.** $461 × 5
6. 6905 × 7	**7.** 4188 × 8	**8.** 78 495 × 9	**9.** 35 926 × 3	**10.** $84.47 × 4
11. 72 × 20	**12.** 925 × 50	**13.** 3816 × 90	**14.** 162 × 400	**15.** $734 × 600
16. 32 × 28	**17.** 58 × 67	**18.** 706 × 98	**19.** 195 × 19	**20.** $5.79 × 35
21. 4675 × 58	**22.** 6868 × 14	**23.** 238 × 357	**24.** 404 × 717	**25.** $19.98 × 66
26. 5932 × 487	**27.** 4026 × 639	**28.** $471 × 394	**29.** $5.76 × 638	**30.** $11.95 × 285

Round each factor and multiply to estimate the product.

31. 42 × 68	**32.** 875 × 33	**33.** 6904 × 49	**34.** 826 × 417	**35.** 3802 × 628

Solve.

36. The potato plants are in 47 rows with 175 plants in each row. How many potato plants are there in all?

37. In one year Mr. Coe sold 124 of one kind of car for $4375 each. What was Mr. Coe's sales total for the car that year?

38. 275 children signed up for each of the 5 day camps. How many signed up in all?

39. Mrs. Martin earned $4.55 an hour for 36 h of work. How much did she earn in all?

Multiply.

40. $6 \times 62^{-}$	**41.** 4×593	**42.** 8×1820
43. $2 \times 64\,358$	**44.** 97×32	**45.** 41×723
46. 15×2386	**47.** 593×980	**48.** 282×7935
49. $4 \times \$590$	**50.** $74 \times \$67$	**51.** $321 \times \$5.79$

4 GRAPHING

Collecting Information

Sometimes, information is given to you.

Sometimes, you must ask for it.

SURVEY CHART

When would you like to visit?

	Spring	Summer	Fall	Winter
Nfld.	II	𝍸	𝍸 I	II
N.S.	II	𝍸 II	III	III
P.E.I.	III	𝍸 I	𝍸	I
N.B.	III	IIII	𝍸 I	II
Que.	I	𝍸	III	𝍸 I
Ont.	II	𝍸 II	II	IIII
Man.				

Sometimes, you must look it up,

or perform a task for it.

Working Together

To keep a chart of what you and your classmates eat for breakfast each day of the week,

1. how many rows would you draw on your chart? What name would you give each row?
2. how many columns would you draw on your chart? What would be their titles?

Exercises

Collecting information can be made easier if you are prepared. Try some of these.

1. Draw a ballot you could use in an election for club president, vice-president, and secretary.

2. Draw a survey form you could use to find out the three favorite songs, in order, of your classmates.

3. Draw a chart you could use to list the time it takes you to go from one place to another for each of five places in your town.

4. Draw a chart you could use for a week to keep track of the television shows you watch and the time you spend watching them.

5. Draw a survey form you could use to find out which television shows people watch.

6. Draw a chart you could use to list the height, mass, and age of each person in your class.

7. Draw a chart you could use to compare grocery prices in three grocery stores.

8. Draw a chart you could use to compare prices in three take-out pizza restaurants.

9. Draw a diagram you could use for counting cars passing a street corner near your school.

10. Draw a chart you could use to keep track of how you use your money.

11. Draw a chart you could use to keep track of the scores of all the league games played in one season.

12. Draw a chart you could use to keep track of the high, the low, and the noontime temperatures each day for a month.

13. On an automobile trip you read other license plates to see where they are from. Draw a chart you could use to keep track of the information.

*__14.__ You have to place the order at the fast-food restaurant. There are five others in your group. Show how you could organize all the choices into one order.

Add, subtract, or multiply.

1. 458 + 165	**2.** 2478 + 3687	**3.** 1284 + 567 + 2193
4. 890 − 482	**5.** 4257 − 672	**6.** 33 302 − 28 365
7. 6 × 584	**8.** 35 × 97	**9.** 47 × 7068
10. 3315 − 1139	**11.** 8 × 2805	**12.** 726 + 1464
13. 24 × 345	**14.** 13 964 + 19 063	
15. 4000 − 1945	**16.** 319 × 1486	

KEEPING SHARP

Organizing Information

Gwen asked schoolmates, "What is your favorite pastime?"
She marked a **tally** for each answer.

	Soccer	Stamp Collecting	Skating	Swimming	Television	Hockey	Hiking	Skateboarding	Reading	Bicycling	Baseball	Fishing
Girls	|	|||	𝍸 |	𝍸 ||	𝍸	𝍸 |	|||	𝍸 ||	𝍸 |||	|||	||	𝍸
Boys	𝍸 |	|||	||	𝍸 |||	𝍸 ||	𝍸 |||	|||	𝍸	𝍸	𝍸 |	|||	|||

Then she completed this chart.

Indoor		✓	✓	✓	✓	✓			✓			
Outdoor	✓		✓	✓		✓	✓	✓		✓	✓	✓
Daytime	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nighttime		✓	✓	✓	✓	✓			✓			
Colder Weather		✓	✓		✓	✓			✓			
Warmer Weather	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Noisy	✓			✓	✓	✓		✓			✓	
Quiet		✓	✓				✓		✓	✓		✓
Alone		✓	✓		✓			✓	✓	✓		✓
With Others	✓		✓	✓		✓	✓			✓	✓	

Working Together

Use Gwen's chart.

1. How many girls said that their favorite pastime is skating?
2. How many boys and girls like skateboarding best?
3. How many boys like a pastime that can be shared with others?
4. How many boys and girls like an indoor pastime best?

Exercises

Use Gwen's chart.

1. How many girls like fishing best?
2. How many boys like hockey best?
3. How many boys and girls like watching television best?
4. How many boys and girls like bicycling or hiking best?
5. How many girls like a pastime that can be done in the daytime?
6. How many boys like a pastime that can be done at night?
7. How many boys and girls like a noisy pastime best?
8. How many girls like a quiet pastime that can be done alone?
9. How many boys like a pastime that can be done outdoors in colder weather?
10. Which quiet pastime is the favorite of the greatest number of boys and girls?

Ask your schoolmates:

11. Make a list of team sports and find out their favorites. Show your results in order. Start with the sport that is the favorite of the greatest number of boys and girls.

Instead of team sports, you may wish to find out their favorite hobbies, school subjects, TV shows, books, animals, chores, holidays, or something else that is especially interesting to you.

Where is the food that you buy prepared?

1. Check labels in your kitchen. Make a tally chart.
2. Think of a good way to show your results to your classmates.

PROBLEM SOLVING

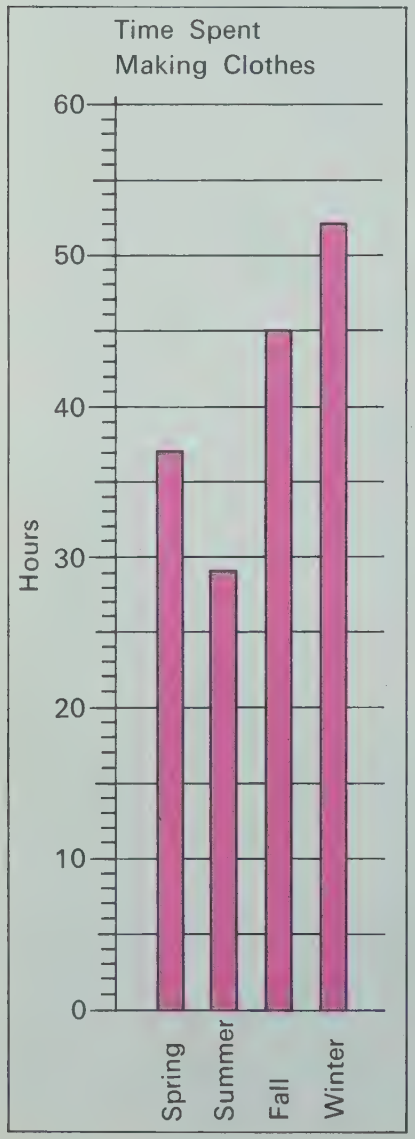
Pictographs and Bar Graphs

Tina counted the things she found in the sewing cabinet.

This **pictograph** shows how many pins, needles, buttons, and snaps she found.

Things in Our Sewing Cabinet	
Pins	
Needles	
Buttons	
Snaps	
Each picture stands for 5 items.	

This **bar graph** shows how much time Tina's parents spent making clothes.



Working Together

From the graphs, tell

1. how many snaps are in the sewing cabinet.
2. how many pins and needles there are.
3. how many more buttons than snaps there are.
4. how many hours were spent making clothes in the fall.
5. how many fewer hours were spent making clothes in the summer than in the spring.

Draw

6. another pictograph that shows how many pins, needles, buttons, and snaps Tina counted. In this graph let each picture stand for 10 items.

Draw a bar graph to show this information:

7.

Our Button Box			
red buttons	8	blue buttons	16
black buttons	13	white buttons	19

Exercises

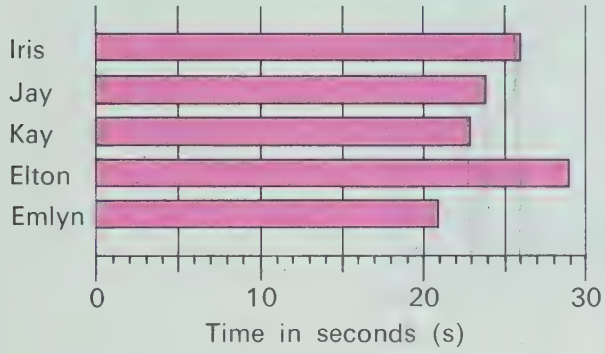
Draw a pictograph to show how many buttons there are of each

1. of 4 colors. **2.** of 3 sizes.

Draw a bar graph to show how many buttons there are

3. of each of 3 sizes. **4.** with two holes or with four holes.

This graph shows the time each runner needed in a foot race.



5. How long did Jay take?

6. Who took the longest time?

7. Who won the race?

8. How many seconds did Kay finish ahead of Iris?

9. Which two runners finished closest together?

Choose a group of people. Collect the information from them and draw a pictograph or a bar graph to show their favorite

10. food, movie, job, flower, story, car, store, color, fruit, song, game, athlete, or something special that you would like to find out about.

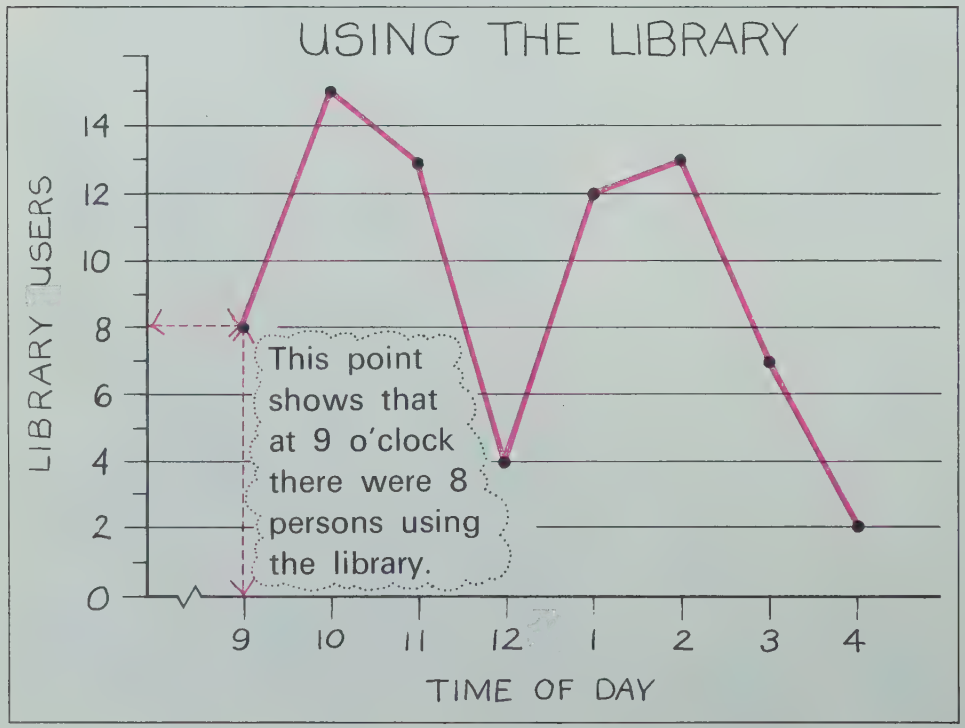
Reading Line Graphs

Tracy counted the number of persons who were using the school library at different times during the day.

Her chart looked like this.

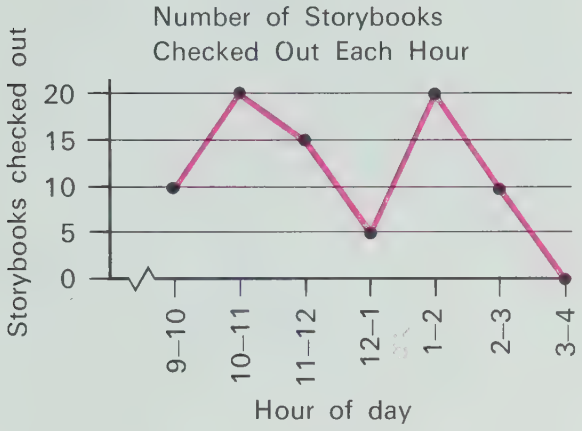
9 o'clock	8
10 o'clock	15
11 o'clock	13
12 o'clock	4
1 o'clock	12
2 o'clock	13
3 o'clock	7
4 o'clock	2

She drew a **line graph** to show her information.



Working Together

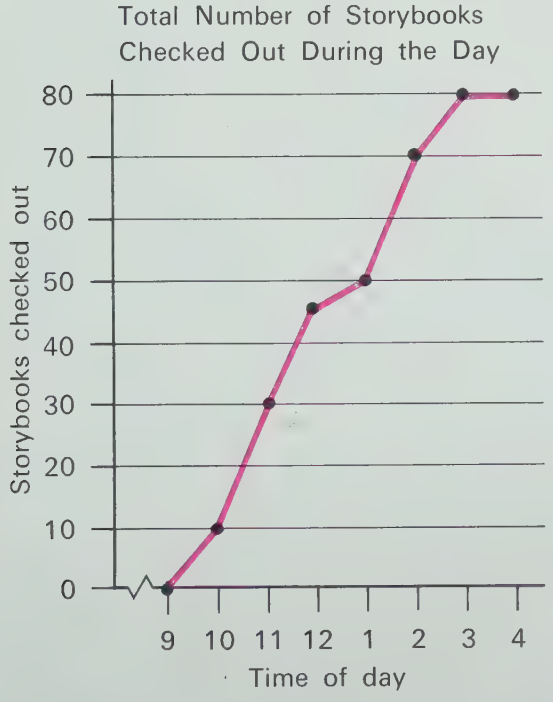
This line graph shows the number of storybooks checked out each hour.



1. How many storybooks were checked out from 9 to 10?
2. How many storybooks were checked out from 1 to 2?
3. During which hour were 15 storybooks checked out?
4. During which hour were the fewest storybooks checked out?
5. Were more storybooks checked out from 11 to 12 or from 2 to 3? How many more?
6. During which hours were the same number of storybooks checked out?

Exercises

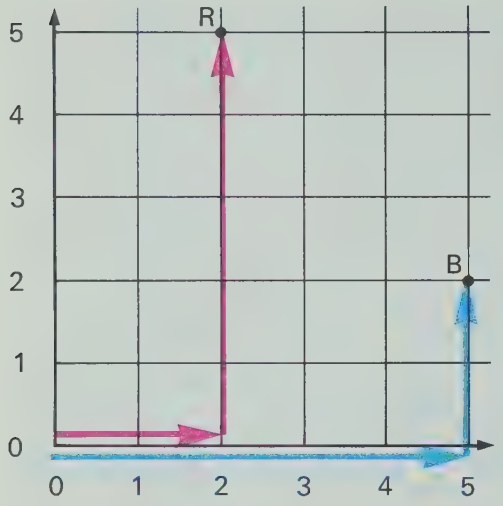
This line graph shows the total number of storybooks checked out during the day.



1. How many storybooks had been checked out by 11 o'clock?
2. How many storybooks had been checked out by 1 o'clock?
3. By what time had 45 storybooks been checked out?
4. By what time had 70 storybooks been checked out?
5. The library opened at 9 in the morning. During which hour in the morning were the most storybooks checked out?
6. During which hour in the morning were the fewest storybooks checked out?
7. During which hour in the afternoon were the most storybooks checked out?
8. During which hour in the afternoon were the fewest storybooks checked out?

Ordered Pairs of Numbers and Points on a Grid

Each point on this grid can be matched with a pair of numbers.



To match point R with a pair of numbers, count over 2 and up 5.

Point R matches the number pair (2,5).

Point B matches (5,2).

(2,5) and (5,2) are the same pair of numbers, but their *order* is different.

(2,5) and (5,2) are **ordered pairs** of numbers.

(2,5) and (5,2) are *different* ordered pairs of numbers.

Each ordered pair of numbers can be matched with a point on a grid.

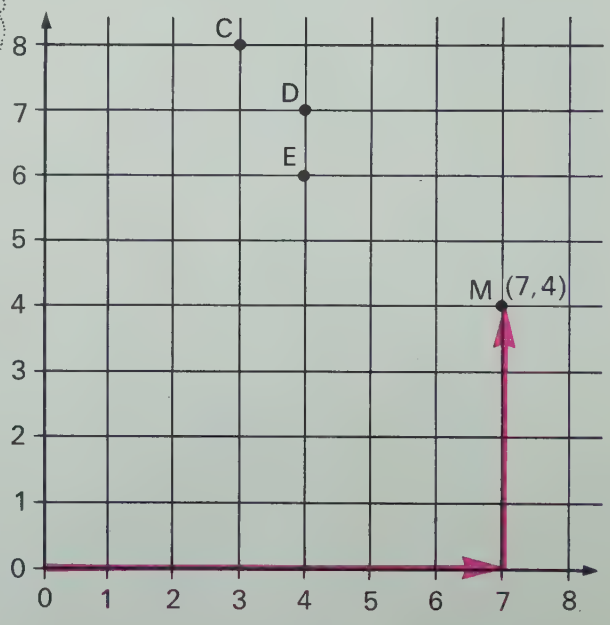
First, draw a **horizontal** number line and a **vertical** number line, starting from the same point.

To match the ordered pair (7,4) with a point on the grid, count over 7 and up 4.

(7,4) matches point M.

(4,7) is the same pair of numbers as (7,4), but it is a different *ordered* pair of numbers.

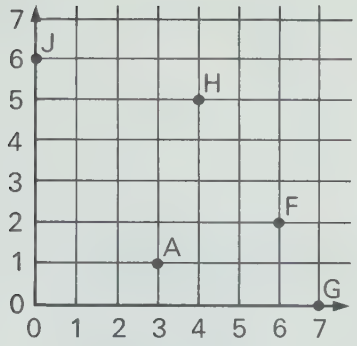
Find out which of the points C, D, or E, matches (4,7).



Working Together

Complete.

		Count over	Count up
1.	point A	?	?
2.	point F	?	?
3.	point G	?	?



Give the ordered pair of numbers matching **4.** point H. **5.** point J.

Use graph paper. Draw a horizontal number line and a vertical number line, starting from the same point. Then plot each of these.

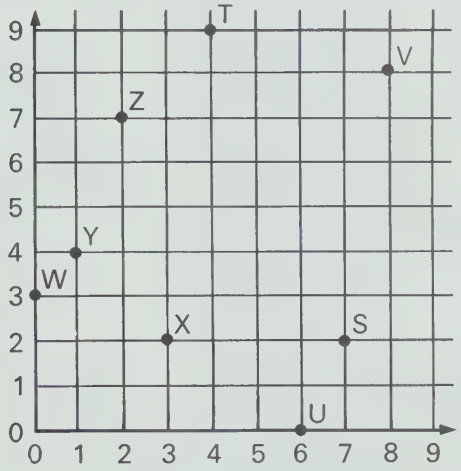
When you draw a dot for an ordered pair of numbers, you are **plotting** the point.

6. B(6,3) **7.** E(1,0) **8.** R(0,8)

Exercises

Give the ordered pair of numbers that matches

1. point Z. **2.** point Y.
3. point X. **4.** point W.
5. point V. **6.** point U.
7. point T. **8.** point S.



Use graph paper. Draw a horizontal number line and a vertical number line, starting from the same point. Then plot each of these.

9. A(3,5) **10.** B(0,7) **11.** C(5,3) **12.** D(1,4) **13.** E(2,2) **14.** F(4,0)
15. G(5,5) **16.** H(6,5) **17.** K(7,5) **18.** L(8,5) **19.** P(9,5) **20.** Q(8,6)
21. R(7,7) **22.** S(6,8) **23.** T(5,9) **24.** X(5,8) **25.** Y(5,7) **26.** Z(5,6)

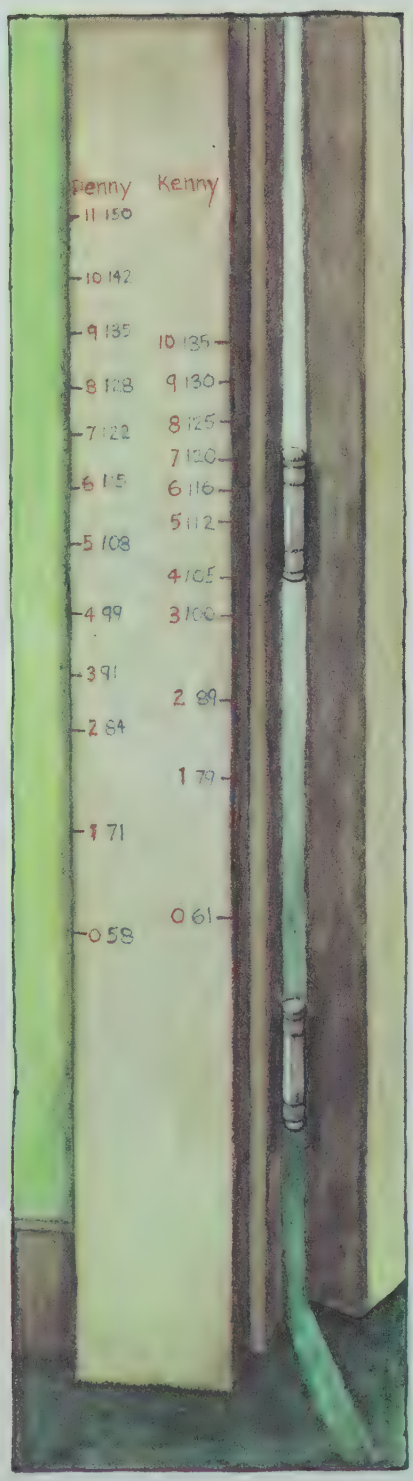
Find the result. Work with the grouped numerals first.

1. (89 + 176) × 497
2. 5000 − (2974 + 1036)
3. (75 × 62) − 3895
4. 6215 − (4037 − 1859)
5. 28 × (1410 − 684)
6. 40 512 − (23 × 1688)
7. (3028 − 2996) × (593 + 1674)

KEEPING SHARP

Drawing Line Graphs

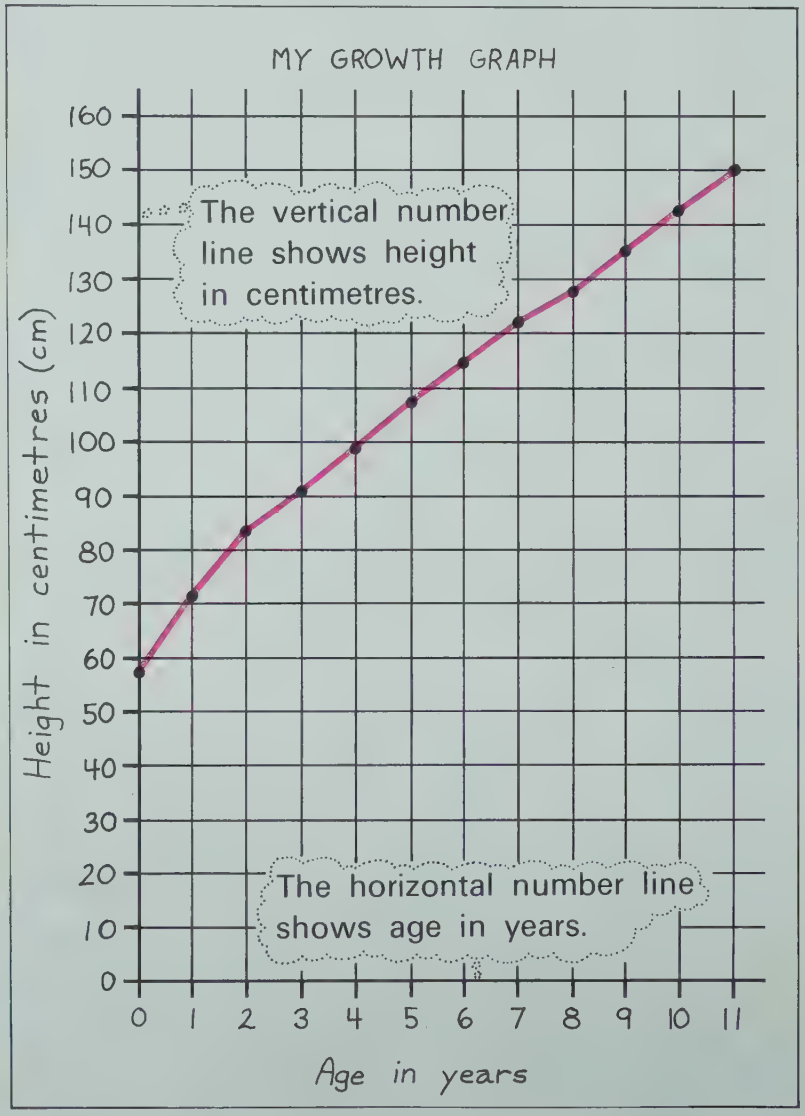
The information used for a line graph is often in the form of ordered pairs of numbers. To draw the line graph you must plot the points and then connect them.



Each year on their birthdays, Penny and Kenny have their heights marked on a door frame in their home.

The first number at each mark gives age.
The second number gives height.

Penny drew a line graph to show how she has grown in 11 years.



Working Together

Use graph paper.

1. Start at a point and draw a horizontal number line. Mark it to show *hours*.
2. Start at the same point and draw a vertical number line. Mark it to show *kilometres*.
3. Plot the information shown in the chart.

Time (in hours)	Distance (in kilometres)
0	0
1	6
2	11
3	15
4	18

4. Connect the points to make a line graph.

What do you think the line graphs that you draw might be showing?

Exercises

Draw a line graph for each.

1. Mark the horizontal number line to show *days*. Mark the vertical number line to show *centimetres*.

Time (in days)	Height (in centimetres)
0	0
3	1
6	3
9	5
12	7

2. Mark the horizontal number line to show *kilograms*. Mark the vertical number line to show *dollars*.

Mass (in kilograms)	Cost (in dollars)
2	4
3	6
5	10
9	18
12	24

3. Mark the horizontal number line to show *years*. Mark the vertical number line to show *kilograms*.

Time (in years)	Mass (in kilograms)
0	4
2	12
4	16
6	21
8	26
10	32

Gather the information and draw a line graph to show

4. the temperature during the daytime.
5. the high temperature each day for a month.

Draw

*6. a Growth Graph for Kenny.

*7. the Growth Graphs for Penny and Kenny on the same grid.

Collecting, Organizing, and Displaying Information

Is this the "typical" student?

In your school or class, what is the typical student like . . .

height? color of eyes?
size of feet? favorite clothes?
. . . and so on.

What does the typical student like to do . . .

in school? at home?
on Saturdays? with spare time?
. . . and so on.

What does the typical student like to eat . . .

for breakfast? from a lunch box?
kinds of fruit? kinds of snacks?
. . . and so on.

Where does the typical student come from . . .

birthplace? size of family?
which street? distance from school?
. . . and so on.

What does the typical student want to do . . .

next summer? as a teenager?
that's exciting? in an adult career?
. . . and so on.

PROBLEM SOLVING

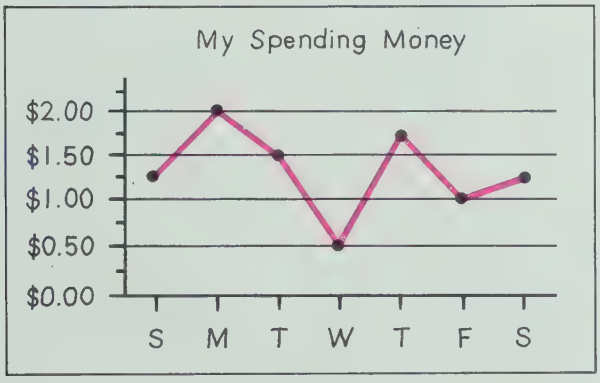
1. Choose a question from this page or make up your own about the typical student.
2. Collect and organize the information you need to answer the question.
3. Display your results with a chart, a picture, or a graph.

Checking Up

Food Containers in Our Kitchen	
Boxes	
Bottles	
Bags	
Cans	
Each picture stands for 4 items.	

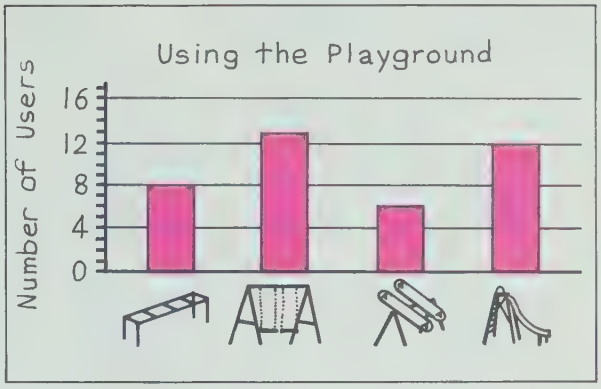
For this pictograph,

1. how many bags are in the kitchen?
2. of which kind of container is there the greatest number?
3. how many bottles and cans are there together?
4. are there more bottles or cans? How many more?



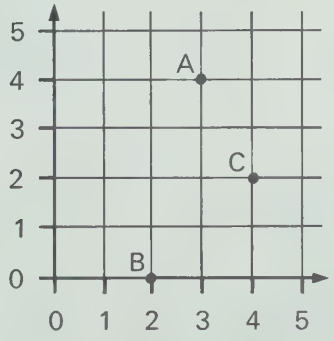
For this line graph,

9. on which day was there the greatest amount?
10. how much was there on Tuesday?
11. on which day was there $1.75?
12. was there more money on Thursday or on Friday? How much more?



For this bar graph,

5. which piece of equipment is most popular?
6. which piece of equipment is least popular?
7. how many children played on the slide?
8. did more children play on the slide or monkey bars? How many more?



Name each point with an ordered pair of numbers.

13. A **14.** B **15.** C

Use graph paper. Draw horizontal and vertical number lines starting from the same point. Then plot each of these.

16. P(3,1) **17.** S(0,4)
18. X(5,3) **19.** Y(1,2)

Checking Skills

Add.

1. 164
142

2. 235
365

3. 2894
1945

4. 4936
1289

5. 28 354
3 349

6. 58 567
37 874

7. $15 978
6 581

8. $29.64
43.87

9. 2584
168
1766

10. $3498
564
2368

11. 2 285
357
14 606
6 159

12. $126.82
75.93
121.67
98.74

13. 307 + 469
14. 567 + 253
15. 3379 + 276
16. 1986 + 5126
17. 26 585 + 23 751
18. 14 587 + 46 945
19. 352 + 2276 + 442
20. 15 917 + 4 668 + 17 439
21. $3104 + $1866
22. $27.47 + $2.83
23. $891 + $2377 + $1548
24. $25.98 + $6.87 + $12.78

Subtract.

1. 335
173

2. 532
264

3. 1316
844

4. 2274
1775

5. 11 858
3 963

6. 67 248
48 659

7. 4000
1785

8. 20 000
16 026

9. 7082
184

10. 14 001
2 533

11. $743
589

12. $6000
2431

13. $23.14
9.26

14. $95.00
54.24

15. 582 – 125
16. 3637 – 941
17. 4281 – 3345
18. 15 359 – 9 769
19. 26 371 – 18 398
20. 32 113 – 29 526
21. 7000 – 2073
22. 40 050 – 1 698
23. $9150 – $1976
24. $40 500 – $4 147
25. $12.55 – $2.87
26. $20.00 – $9.26

Multiply.

1. 193 × 7

2. 2306 × 4

3. 38 × 51

4. 506 × 58

5. 2595 × 40

6. 1756 × 89

7. 149 × 461

8. 578 × 217

9. 1945 × 162

10. 4730 × 358

11. \$54 × 16

12. \$425 × 45

13. \$6.31 × 2

14. \$28.47 × 87

15. 6 × 290

16. 9 × 5484

17. 92 × 92

18. 67 × 235

19. 50 × 8739

20. 73 × 2260

21. 261 × 766

22. 349 × 628

23. 193 × 3509

24. 345 × 1271

25. 28 × \$885

26. 365 × \$701

27. 84 × \$9.21

28. 6 × \$39.80

Solve.

1. The forestry workers planted 28 225 pine tree seedlings. They planted 24 790 fir tree seedlings. How many seedlings did they plant in all?

2. The pickle plant can pack 17 750 jars of pickles each hour. How many jars can it pack in an 8 h shift?

3. The store placed 23 500 books on sale. After one week, it still had 8767 of the books. How many had it sold?

4. Lila does 75 sit-ups each day. How many does she do in a year?

5. Mrs. Meyer won \$2000 in a contest. Taxes on her prize were \$637. How much did she have after taxes?

6. On three trips to the Northwest Territories, conservation officers counted 3760, 12 570, and 6225 moose. How many did they count in all?

7. 4185 tickets were sold in advance. 3648 people went to each of the 3 games. How many tickets were sold at the gate?

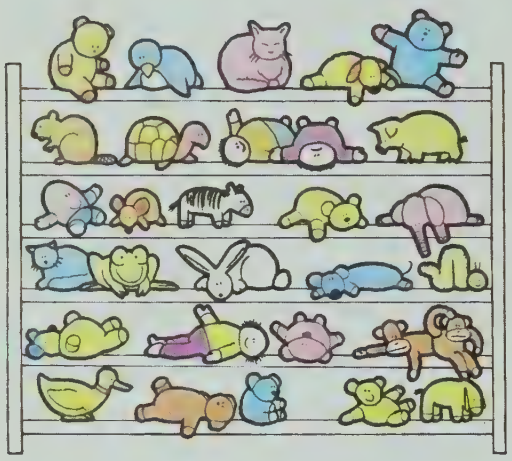
8. Terry earned \$24.87 on his paper route and \$9.75 raking leaves. He spent \$28.75. How much did he have left?

9. Mr. Ali earns \$775 each month. Mrs. Ali earns \$438 each month working part time. How much do the Ali's earn in a year?

5 DIVISION

Using Multiplication to Divide

Angela had 6 shelves in her room for her 30 animals. If she wanted to keep the same number on each shelf, how many animals should she keep on each shelf?



Divide 30 by 6.

For $6\overline{)30}$,

think $6 \times \square = 30$

$6 \times 5 = 30$

$$6\overline{)30}\quad 5$$

There should be 5 animals on each shelf.

Later, when Angela needed two of her shelves for other things, she had just four shelves to use for her animals.

Divide 30 by 4.

For $4\overline{)30}$,

think $4 \times 7 = 28$

$4 \times 8 = 32$ . . . too many!

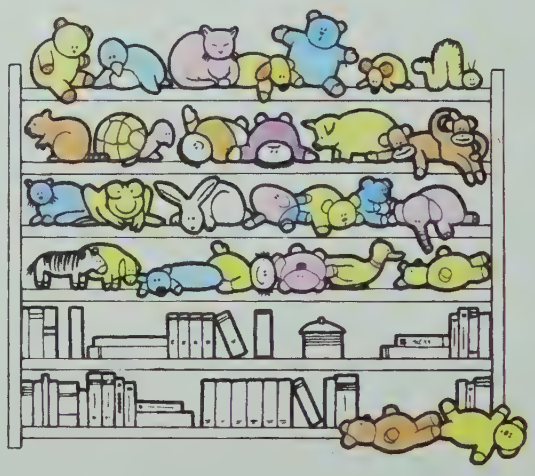
Write

$$\begin{array}{r} 7 \\ 4\overline{)30} \\ \underline{28} \\ 2 \end{array}$$

7 animals for each shelf

28 animals on shelves

2 animals remaining



Angela can place 7 animals on each shelf and there will be 2 left over.

Here is another way to show the remainder in a division.

quotient 7 R2 remainder

$4\overline{)30}$

divisor 28 dividend

2

Working Together

Give the multiples of each of these, from 1 × ▒ to 9 × ▒.

1. 2 **2.** 3 **3.** 4 **4.** 5 **5.** 6 **6.** 7 **7.** 8 **8.** 9

Each dividend is a multiple of the divisor. Complete the matching multiplication fact.

9. For $8\overline{)24}$, use $8 \times$ ▒ $= 24$.

10. For $3\overline{)18}$, use $3 \times$ ▒ $= 18$.

Give the greatest multiple of 7 that is less than the dividend.

Example: For $7\overline{)33}$, use $7 \times 4 = 28$.

14. $7\overline{)22}$ **15.** $7\overline{)53}$

Find the quotient. Give the multiplication fact you use.

11. $2\overline{)10}$

12. $7\overline{)49}$

13. $48 \div 6$

Complete.

16. $7\overline{)38}$

35 ← 7 × ▒

3

17. $6\overline{)40}$

▒ ← 6 × ▒

▒

Find the quotient and the remainder. Give the multiplication fact you use.

18. $3\overline{)16}$ **19.** $52 \div 6$ **20.** $7\overline{)26}$ **21.** $28 \div 4$ **22.** $9\overline{)26}$

Exercises

Write the six quotients for each row. Which row can you do the fastest?

1.	$2\overline{)6}$	$3\overline{)15}$	$4\overline{)28}$	$2\overline{)16}$	$3\overline{)9}$	$4\overline{)32}$
2.	$18 \div 2$	$18 \div 3$	$18 \div 6$	$24 \div 3$	$24 \div 4$	$24 \div 8$
3.	$3\overline{)12}$	$4\overline{)12}$	$5\overline{)30}$	$6\overline{)30}$	$7\overline{)56}$	$8\overline{)56}$
4.	$16 \div 4$	$25 \div 5$	$36 \div 6$	$49 \div 7$	$64 \div 8$	$81 \div 9$
5.	$7\overline{)28}$	$5\overline{)20}$	$9\overline{)36}$	$2\overline{)8}$	$8\overline{)32}$	$6\overline{)24}$
6.	$48 \div 8$	$35 \div 7$	$72 \div 9$	$42 \div 7$	$72 \div 8$	$63 \div 9$

Divide. Show the quotient and the remainder.

7. $6\overline{)33}$ **8.** $2\overline{)15}$ **9.** $8\overline{)37}$ **10.** $7\overline{)43}$ **11.** $4\overline{)19}$ **12.** $8\overline{)79}$

13. $5\overline{)39}$ **14.** $9\overline{)71}$ **15.** $6\overline{)40}$ **16.** $3\overline{)11}$ **17.** $7\overline{)61}$ **18.** $9\overline{)52}$

19. $43 \div 8$ **20.** $15 \div 4$ **21.** $47 \div 6$ **22.** $26 \div 3$ **23.** $39 \div 9$ **24.** $34 \div 4$

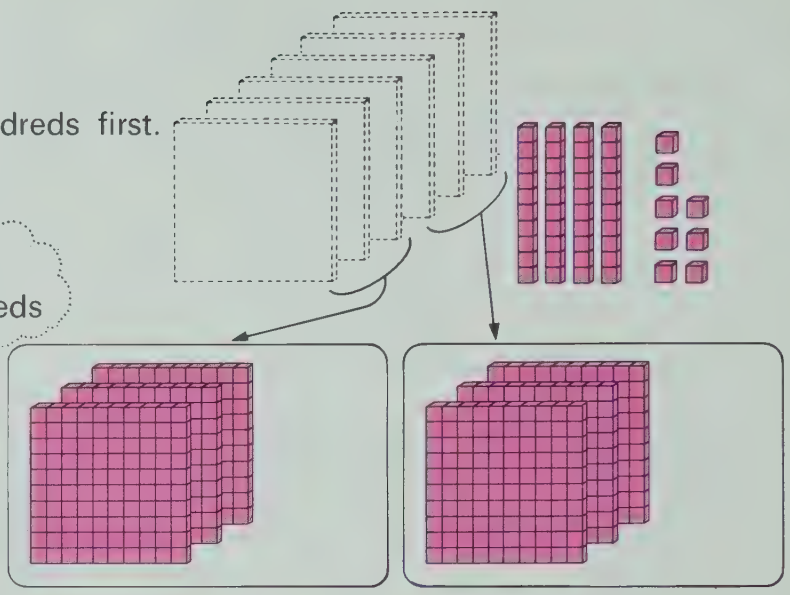
25. $21 \div 6$ **26.** $19 \div 2$ **27.** $20 \div 3$ **28.** $46 \div 5$ **29.** $53 \div 7$ **30.** $60 \div 8$

Sharing Hundreds, Tens, and Ones

Divide 648 by 2.

6 hundreds 4 tens 8 ones

For $2\overline{)648}$, share the 6 hundreds first.



Think

$2 \times 3 = 6$

2×3 hundreds $= 6$ hundreds

$2 \times 300 = 600$

Write

$$\begin{array}{r} 300 \\ 2\overline{)648} \\ 600 \\ \hline 48 \end{array}$$

still to share

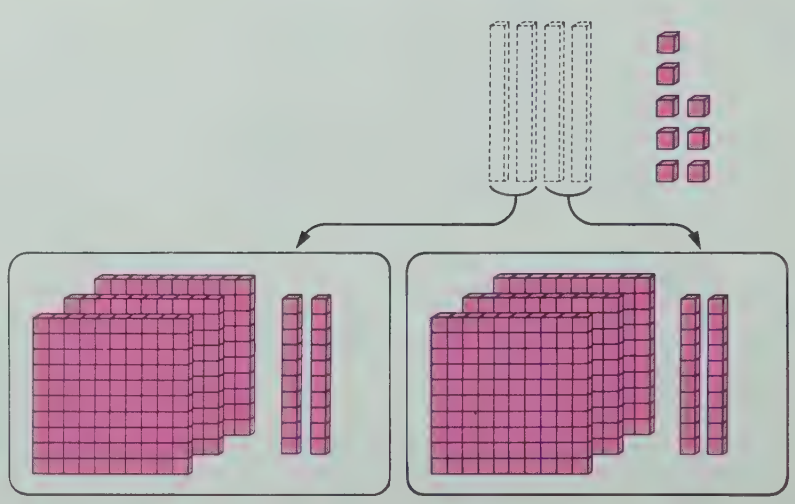
Next, share the 4 tens.

Think

$2 \times 2 = 4$

2×2 tens $= 4$ tens

$2 \times 20 = 40$



Write

$$\begin{array}{r} 20 \\ 300 \\ 2\overline{)648} \\ 600 \\ \hline 48 \\ 40 \\ \hline 8 \end{array}$$

still to share

Then, share the 8 ones.

Think $2 \times 4 = 8$

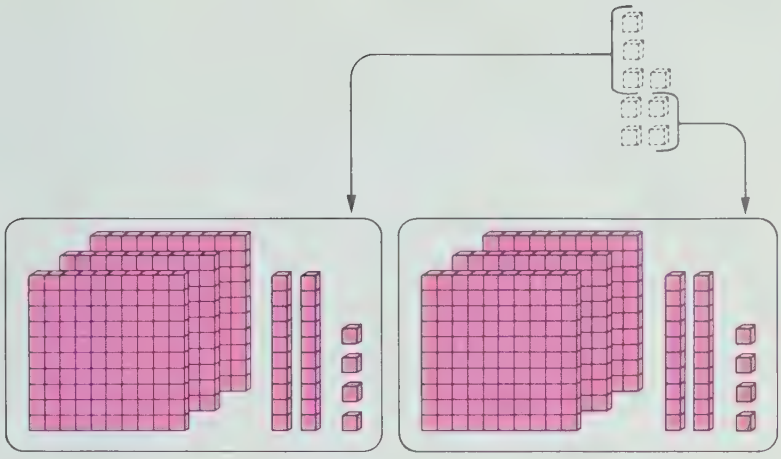
Write

$$\begin{array}{r} 4 \\ 20 \\ 300 \\ \hline 2\overline{)648} \\ 600 \\ \hline 48 \\ 40 \\ \hline 8 \\ 8 \\ \hline 0 \end{array}$$

Add for the quotient.

$$\begin{array}{r} 4 \\ 20 \\ 300 \\ \hline 2\overline{)648} \\ 600 \\ \hline 48 \\ 40 \\ \hline 8 \\ 8 \\ \hline 0 \end{array} \rightarrow 324$$

When 648 is divided by 2, the quotient is 324.



Working Together

How many hundreds, how many tens, and how many ones are named in each?

1. 402 **2.** 720 **3.** 86

Divide.

4. $3\overline{)690}$ **5.** $2\overline{)264}$ **6.** $804 \div 4$

Exercises

Divide.

1. $2\overline{)448}$ **2.** $3\overline{)366}$ **3.** $2\overline{)680}$ **4.** $4\overline{)448}$

5. $7\overline{)77}$ **6.** $2\overline{)288}$ **7.** $2\overline{)800}$ **8.** $3\overline{)903}$

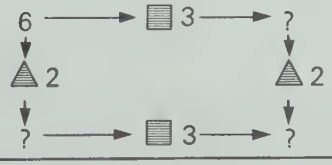
9. $484 \div 4$ **10.** $360 \div 3$ **11.** $668 \div 2$

12. $939 \div 3$ **13.** $606 \div 6$ **14.** $393 \div 3$

15. $842 \div 2$ **16.** $80 \div 4$ **17.** $636 \div 3$

Choose one operation sign and use it in each ▭.
Choose one operation sign and use it in each △.

How many ways can you choose the operations so that both paths give the same result?



Operation signs
+
−
×
÷

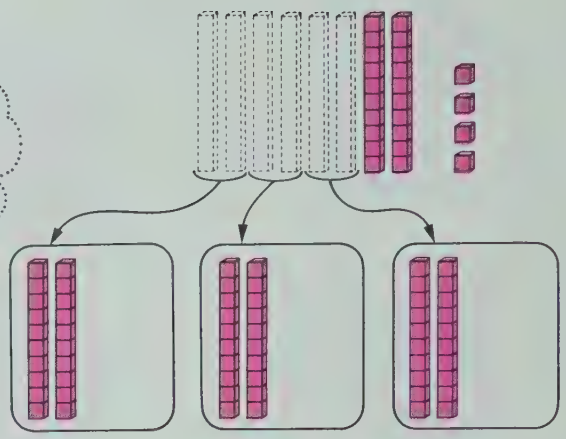
try this

Regrouping Tens

Divide 84 by 3.
84 equals 8 tens 4 ones.

For $3\overline{)84}$, share the 8 tens first.

$3 \times 2 = 6$, $3 \times 3 = 9$ . . . too many!
3×2 tens = 6 tens
$3 \times 20 = 60$



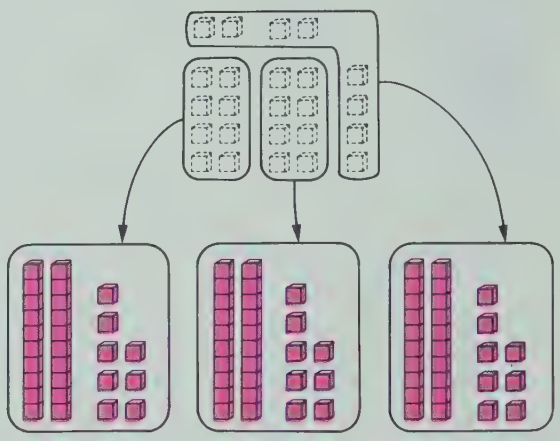
Write

$$\begin{array}{r} 20 \\ 3\overline{)84} \\ 60 \\ \hline 24 \end{array}$$

still to share

Think of the 2 tens 4 ones that remain as 24 ones.
Then share the 24 ones.

$3 \times 8 = 24$



Write

$$\begin{array}{r} 8 \\ 20 \\ 3\overline{)84} \\ 60 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$$

Add for the quotient.

$$\begin{array}{r} 8 \\ 20 \\ 3\overline{)84} \\ 60 \\ \hline 24 \\ 24 \\ \hline 0 \end{array} \rightarrow 28$$

When 84 is divided by 3, the quotient is 28.

Working Together

Give the first multiplication fact you can use to find the quotient.

Example: For $2\overline{)92}$, use

$\boxed{2 \times 4 = 8}$

2×4 tens $= 8$ tens,

or $2 \times 40 = 80$.

1. $2\overline{)52}$ **2.** $4\overline{)64}$ **3.** $3\overline{)76}$

Complete.

4. $6\overline{)84}$

10

60

24

0

5. $3\overline{)70}$ R

60

10

1

Divide.

6. $4\overline{)92}$ **7.** $38 \div 2$ **8.** $5\overline{)72}$

Exercises

Before playing the game the 3 girls have to share the chips equally.

1. There are 81 blue chips.
How many will each girl get?

2. There are 49 red chips.
How many will each girl get?
How many will be left over?

3. There are 74 white chips.
How many will each girl get?
How many will be left over?

Divide.

4. $3\overline{)54}$ **5.** $2\overline{)37}$ **6.** $4\overline{)52}$

7. $8\overline{)44}$ **8.** $6\overline{)82}$ **9.** $5\overline{)85}$

10. $2\overline{)74}$ **11.** $4\overline{)66}$ **12.** $7\overline{)98}$

13. $99 \div 4$ **14.** $96 \div 2$ **15.** $79 \div 3$

16. $72 \div 6$ **17.** $76 \div 4$ **18.** $53 \div 2$

19. $90 \div 8$ **20.** $87 \div 3$ **21.** $97 \div 7$

You can multiply the divisor and the quotient, then add the remainder, to check your work.

× then +

24 R3

Example: For $4\overline{)99}$

multiply → $4 \times 24 = 96$

then add → $96 + 3 = 99$

If your result does not match the dividend, there is a mistake in your work.

22. Check your work for Exercises 1 to 21.

Regrouping Hundreds, Regrouping Tens

When 4 persons share 520 building pieces equally, each will get more than 100 pieces.

To find the exact amount, divide 520 by 4.

520 = 5 hundreds 2 tens 0 ones

For $4\overline{)520}$, divide the 5 hundreds first.

$4 \times 1 = 4$, $4 \times 2 = 8$ . . . too many!

4 × 1 hundred = 4 hundreds

$4 \times 100 = 400$

Write

$$\begin{array}{r} 100 \\ 4\overline{)520} \\ 400 \\ \hline 120 \end{array}$$

Think of the 1 hundred 2 tens that remain as 12 tens. Then divide the 12 tens.

$4 \times 3 = 12$

4 × 3 tens = 12 tens

$4 \times 30 = 120$

Write

$$\begin{array}{r} 30 \\ 100 \\ 4\overline{)520} \\ 400 \\ \hline 120 \\ 120 \\ \hline 0 \end{array} \rightarrow 130$$

Add for the quotient.

no more to divide

When 4 share the building pieces equally, each gets 130 pieces.

When 6 persons share 520 building pieces equally, each will get fewer than 100 pieces.

To find the exact amount, divide 520 by 6.

For $6\overline{)520}$, there are not enough hundreds to give 1 hundred to each of the 6. Think of 5 hundreds 2 tens as 52 tens. Then divide the 52 tens.

$6 \times 8 = 48$, $6 \times 9 = 54$ . . . too many!

6 × 8 tens = 48 tens

$6 \times 80 = 480$

Write

$$\begin{array}{r} 80 \\ 6\overline{)520} \\ 480 \\ \hline 40 \end{array}$$

Think of the 4 tens 0 ones that remain as 40 ones. Then divide the 40 ones.

$6 \times 6 = 36$

$6 \times 7 = 42$ . . . too many!

Write

$$\begin{array}{r} 6 \\ 80 \\ 6\overline{)520} \\ 480 \\ \hline 40 \\ 36 \\ \hline 4 \end{array} \rightarrow 86 \text{ R4}$$

Add and write the remainder to finish.

When 6 share equally, each gets 86 pieces with 4 pieces left over.

Working Together

Give the first multiplication fact you can use to find the quotient.

Example: For $6\overline{)468}$, use $\boxed{6 \times 7 = 42}$,
6×7 tens $= 42$ tens,
or $6 \times 70 = 420$.

1. $2\overline{)938}$ **2.** $7\overline{)546}$ **3.** $4\overline{)902}$

Complete.

4. $3\overline{)741}$

$\underline{600}$ ← $3 \times$ ▪
141
$\underline{120}$ ← $3 \times$ ▪
21
$\underline{21}$ ← $3 \times$ ▪
0

Add to find the quotient.

Divide.

5. $5\overline{)890}$ **6.** $512 \div 8$ **7.** $6\overline{)808}$

Exercises

Divide.

1. $4\overline{)348}$ **2.** $3\overline{)449}$ **3.** $7\overline{)875}$

4. $9\overline{)306}$ **5.** $8\overline{)704}$ **6.** $2\overline{)553}$

7. $6\overline{)341}$ **8.** $7\overline{)999}$ **9.** $5\overline{)380}$

10. $663 \div 5$ **11.** $152 \div 8$

12. $702 \div 6$ **13.** $394 \div 7$

14. $168 \div 3$ **15.** $190 \div 2$

16. $666 \div 8$ **17.** $503 \div 4$

18. $711 \div 9$ **19.** $824 \div 6$

How many building blocks will each get

20. when 735 are divided among 3?

21. when 735 are divided among 5?

22. when 735 are divided among 8?

Remember, you can multiply the divisor and quotient, then add the remainder to check a division.

Dividing by a One-Digit Number

Billy's library books have a total of 1134 pages. They must be returned in 3 weeks. If Billy reads about the same number of pages each week, how many pages would he have to read each week to finish the books?

Divide 1134 by 3.

For $3\overline{)1134}$, there are not enough thousands for 1 thousand pages to be read each week. Think of 1 thousand 1 hundred as 11 hundreds. Then divide the 11 hundreds.

$3 \times 3 = 9$, $3 \times 4 = 12$ . . . too many!
3×3 hundreds $= 9$ hundreds
$3 \times 300 = 900$

Write
$$\begin{array}{r} 300 \\ 3\overline{)1134} \\ 900 \\ \hline 234 \end{array}$$

Think of the 2 hundreds 3 tens 4 ones that remain as 23 tens 4 ones. Then, divide the 23 tens.

$3 \times 7 = 21$, $3 \times 8 = 24$ . . . too many!
3×7 tens $= 21$ tens
$3 \times 70 = 210$

Write
$$\begin{array}{r} 70 \\ 300 \\ 3\overline{)1134} \\ 900 \\ \hline 234 \\ 210 \\ \hline 24 \end{array}$$

Think of the 2 tens 4 ones that remain as 24 ones. Then divide the 24 ones.

$3 \times 8 = 24$

Write
$$\begin{array}{r} 8 \\ 70 \\ 300 \\ 3\overline{)1134} \\ 900 \\ \hline 234 \\ 210 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$$

→ 378

Add for the quotient.

Billy would have to read 378 pages each week to finish the books.

Working Together

Complete.

Add to find the quotient.

1. $4\overline{)7324}$

$4000 \leftarrow 4 \times$ ▪

3324

$3200 \leftarrow 4 \times$ ▪

124

$120 \leftarrow 4 \times$ ▪

4

$4 \leftarrow 4 \times$ ▪

0

2. $9\overline{)3207}$

$2700 \leftarrow 9 \times$ ▪

507

$450 \leftarrow 9 \times$ ▪

57

$54 \leftarrow 9 \times$ ▪

3

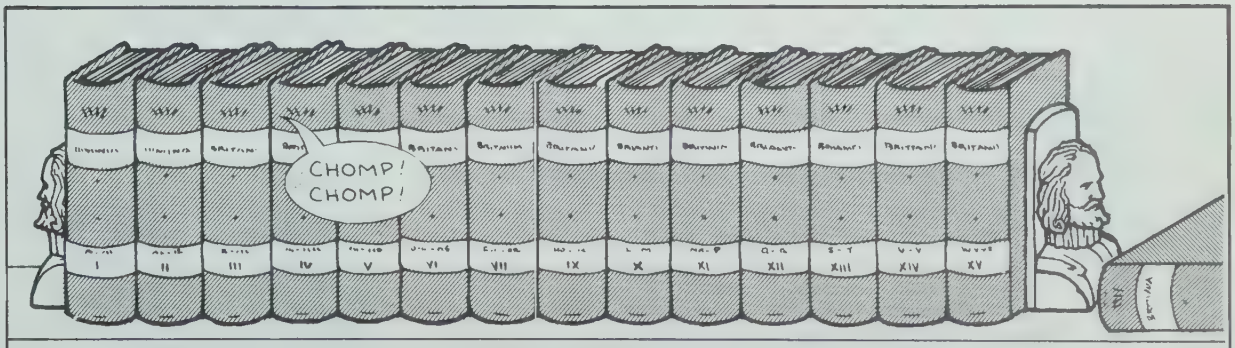
Divide.

3. $3\overline{)7401}$ **4.** $27\,832 \div 8$ **5.** $6\overline{)1726}$

Exercises

Divide.

1. $3\overline{)5244}$	**2.** $2\overline{)7257}$	**3.** $7\overline{)217}$	**4.** $4\overline{)24\,690}$	**5.** $8\overline{)3600}$
6. $5\overline{)878}$	**7.** $5\overline{)24\,465}$	**8.** $2\overline{)94}$	**9.** $8\overline{)15\,915}$	**10.** $6\overline{)7409}$
11. $6\overline{)40\,734}$	**12.** $3\overline{)1078}$	**13.** $7\overline{)1740}$	**14.** $9\overline{)3573}$	**15.** $4\overline{)1520}$
16. $2850 \div 8$	**17.** $17\,830 \div 2$	**18.** $80 \div 3$	**19.** $56\,110 \div 9$	**20.** $419 \div 7$
21. $2250 \div 6$	**22.** $23\,659 \div 4$	**23.** $216 \div 8$	**24.** $13\,000 \div 5$	**25.** $16\,650 \div 9$



Bookworm started from outside the front cover of Volume I and tunnelled its way to outside the back cover of Volume XV. Each volume is 4 cm (centimetres) thick. How far did Bookworm tunnel?

PROBLEM SOLVING

A Shorter Form for Division

Gordie and Carmen shared 175 dominoes equally to see who could build the faster domino course. How many dominoes are they using for each course?

Divide 175 by 2.

For $2\overline{)175}$, there are not enough hundreds so that both Gordie and Carmen get 1 hundred. Think of 1 hundred 7 tens as 17 tens. Then divide the 17 tens.

$2 \times 8 = 16$
$2 \times 8 \text{ tens} = 16 \text{ tens}$
$2 \times 80 = 160$

Longer Form

Write

$$\begin{array}{r} 80 \\ 2\overline{)175} \\ 160 \\ \hline 15 \end{array}$$

Shorter Form

or

$$\begin{array}{r} 8 \\ 2\overline{)175} \\ 160 \\ \hline 15 \end{array}$$

Think of the 1 ten 5 ones that remain as 15 ones. Then divide the 15 ones.

$2 \times 7 = 14$

Write

$$\begin{array}{r} 7 \\ 80 \\ 2\overline{)175} \\ 160 \\ \hline 15 \\ 14 \\ \hline 1 \end{array}$$

or

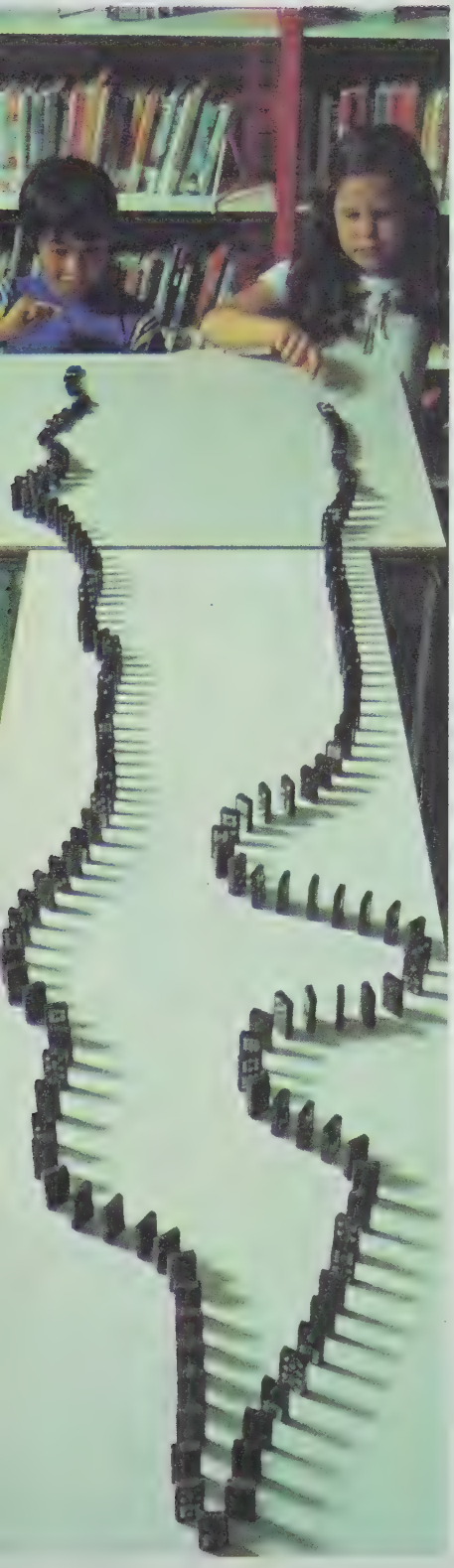
$$\begin{array}{r} 87 \text{ R1} \\ 2\overline{)175} \\ 160 \\ \hline 15 \\ 14 \\ \hline 1 \end{array}$$

Write the remainder here and the work is done.

Add and write the remainder to finish the longer form.

$$\begin{array}{r} 7 \\ 80 \\ 2\overline{)175} \\ 160 \\ \hline 15 \\ 14 \\ \hline 1 \end{array} \rightarrow 87 \text{ R1}$$

Each course has 87 dominoes. The falling dominoes that first reach the 1 domino left over belong to the faster course.



Working Together

Complete.

1. $7\overline{)609}$

$$\begin{array}{r} 8\square \\ 7\overline{)609} \\ \underline{560} \\ 49 \\ \underline{\square} \\ 0 \end{array}$$

2. $8\overline{)5395}$

$$\begin{array}{r} 6\square\square\ R\square \\ 8\overline{)5395} \\ \underline{4800} \\ 595 \\ \underline{\square\square} \\ 35 \\ \underline{\square} \\ 3 \end{array}$$

3. $4\overline{)936}$

$$\begin{array}{r} 2\square\square \\ 4\overline{)936} \\ \underline{800} \\ \square \\ \underline{\square\square} \\ \square \\ \underline{\square} \\ 0 \end{array}$$

Divide. Use the shorter form.

4. $6\overline{)5628}$ **5.** $7296 \div 2$ **6.** $7\overline{)15\,076}$

Exercises

Divide. Use the shorter form.

1. $3\overline{)5490}$ **2.** $7\overline{)22\,876}$ **3.** $6\overline{)407}$

4. $5\overline{)2882}$ **5.** $8\overline{)2797}$ **6.** $4\overline{)29\,700}$

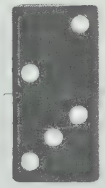
7. $2\overline{)8536}$ **8.** $9\overline{)24\,740}$ **9.** $3\overline{)13\,728}$

10. $1970 \div 6$ **11.** $8863 \div 3$ **12.** $4851 \div 9$

13. $99 \div 5$ **14.** $25\,170 \div 6$ **15.** $7430 \div 2$

16. $20\,679 \div 4$ **17.** $5400 \div 8$ **18.** $40\,000 \div 7$

The face of a domino has 2 parts. If each part can have 0 to 6 dots,



1. how many different faces are possible for a domino?

How would you build a domino course

2. that branches into 3 paths?

3. that crosses itself?

4. that shows your initials?

PROBLEM SOLVING

The Standard Form for Division

Lucy's parents and her two older sisters shared the driving on a trip. They travelled 2376 km and each drove about the same distance. About how far did each drive?

Divide 2376 by 4.

For $4\overline{)2376}$, there are not enough thousands so that each driver could drive 1 thousand kilometres. Think of 2 thousands 3 hundreds as 23 hundreds. Then divide the 23 hundreds.

$4 \times 5 = 20$

4×5 hundreds $= 20$ hundreds

Write
$$\begin{array}{r} 5 \\ 4\overline{)2376} \\ 20 \\ \hline 3 \end{array}$$

You can save time by not writing these zeros.

Think of the 3 hundreds 7 tens that remain as 37 tens.

$$\begin{array}{r} 5 \\ 4\overline{)2376} \\ 20\downarrow \\ \hline 37 \end{array}$$

Then divide the 37 tens.

$4 \times 9 = 36$

4×9 tens $= 36$ tens

Write
$$\begin{array}{r} 59 \\ 4\overline{)2376} \\ 20 \\ \hline 37 \\ 36 \\ \hline 1 \end{array}$$

Think of the 1 ten 6 ones that remain as 16 ones.

$$\begin{array}{r} 59 \\ 4\overline{)2376} \\ 20 \\ \hline 37 \\ 36\downarrow \\ \hline 16 \end{array}$$

Then divide the 16 ones.

$4 \times 4 = 16$

Write
$$\begin{array}{r} 594 \\ 4\overline{)2376} \\ 20 \\ \hline 37 \\ 36 \\ \hline 16 \\ 16 \\ \hline 0 \end{array}$$

Lucy's mother, father, and two sisters each drove about 594 km.

Working Together

Complete.

1.
$$\begin{array}{r} 5\blacksquare \\ 3\overline{)174} \\ \underline{15} \\ 24 \\ \underline{\blacksquare} \\ 0 \end{array}$$

2.
$$\begin{array}{r} 8\blacksquare \\ 9\overline{)756} \\ \underline{72} \\ \blacksquare \\ \underline{\blacksquare} \\ \blacksquare \end{array}$$

3.
$$\begin{array}{r} 8\blacksquare\blacksquare\ \text{R}\ \blacksquare \\ 6\overline{)5084} \\ \underline{48} \\ \blacksquare \\ \underline{\blacksquare} \\ \blacksquare \\ \blacksquare \\ \underline{\blacksquare} \end{array}$$

Divide. Use the standard form.

4. $2\overline{)538}$ **5.** $1491 \div 7$ **6.** $3\overline{)13\,796}$

Exercises

Divide. Use the standard form.

1. $5\overline{)2410}$ **2.** $4\overline{)25\,950}$ **3.** $2\overline{)1238}$

4. $7\overline{)672}$ **5.** $3\overline{)78}$ **6.** $4\overline{)8529}$

7. $9\overline{)85\,929}$ **8.** $8\overline{)45\,425}$ **9.** $3\overline{)5190}$

10. $14\,771 \div 2$ **11.** $6730 \div 5$ **12.** $47\,474 \div 6$

13. $33\,310 \div 7$ **14.** $7524 \div 9$ **15.** $6954 \div 6$

16. $19\,761 \div 5$ **17.** $636 \div 4$ **18.** $3689 \div 8$

If an amount is thought of as being shared equally, the result is an **average**.

Example: If you go 20 km in 4 h, your average distance for each hour is $20 \div 4$, or 5 km.

19. If 2376 km are travelled in 3 d, what is the average distance travelled each day?

What is the average?

20. 152 min to read 4 books

21. 875 g (grams) in 5 apples

22. 87 fish caught from 3 lakes

23. 14 754 tickets for 6 shows

In each case the remainder will be 0:

$2\overline{)}$ even number

$3\overline{)}$ sum of the digits is a multiple of 3

$4\overline{)}$ last 2 digits form a multiple of 4

$5\overline{)}$ last digit is 0 or 5

$9\overline{)}$ sum of the digits is a multiple of 9

Will the remainder be 0?

1. $2\overline{)736}$ **2.** $2\overline{)1380}$

3. $3\overline{)807}$ **4.** $3\overline{)5967}$

5. $4\overline{)316}$ **6.** $4\overline{)9732}$

7. $5\overline{)485}$ **8.** $5\overline{)6730}$

9. $9\overline{)252}$ **10.** $9\overline{)8694}$

Make up a three-digit number that gives a remainder of 0 when it is

11. divided by either 2 or 3.

12. divided by any of 4, 5, or 9.

try this

Practice

Divide. Use the standard form.

1. $3\overline{)5000}$ **2.** $6\overline{)5000}$ **3.** $7\overline{)5000}$ **4.** $8\overline{)5000}$ **5.** $9\overline{)5000}$

6. $4\overline{)39\,816}$ **7.** $6\overline{)39\,816}$ **8.** $7\overline{)39\,816}$ **9.** $8\overline{)39\,816}$ **10.** $9\overline{)39\,816}$

11. $7\overline{)861}$ **12.** $7\overline{)3192}$ **13.** $7\overline{)5523}$ **14.** $7\overline{)8638}$ **15.** $7\overline{)39\,746}$

16. $10\,000 \div 9$ **17.** $20\,000 \div 9$ **18.** $30\,000 \div 9$ **19.** $40\,000 \div 9$

20. $27\,156 \div 4$ **21.** $33\,945 \div 5$ **22.** $40\,734 \div 6$ **23.** $47\,523 \div 7$

24. $54\,312 \div 8$ **25.** $63\,168 \div 8$ **26.** $71\,736 \div 8$ **27.** $77\,424 \div 8$

Divide to find the missing factor.
Then multiply to check your work.

28. $3 \times \square = 87$ **29.** $5 \times \square = 725$ **30.** $8 \times \square = 6864$ **31.** $2 \times \square = 5702$

32. $\square\overline{)5898}$ **33.** $\square\overline{)4311}$ **34.** $\square\overline{)532}$ **35.** $\square\overline{)9438}$ **36.** $\square\overline{)28\,944}$ **37.** $\square\overline{)9925}$

Replace each ■ with a digit to show a division. Do not use the same digit more than once in each exercise.

Example:

For ■■ use $3\overline{)6}$

1. ■■■ **2.** ■■■ **3.** ■■■

4. ■■■■ **5.** ■■■■

6. ■■■■■ **7.** ■■■■■

try this

The farther you go,
the harder they get.
How many can you do?

Make up a division exercise

38. with a quotient of 739.

39. with a divisor of 7 and a quotient of 168.

40. with a quotient of 568 and a remainder of 7.

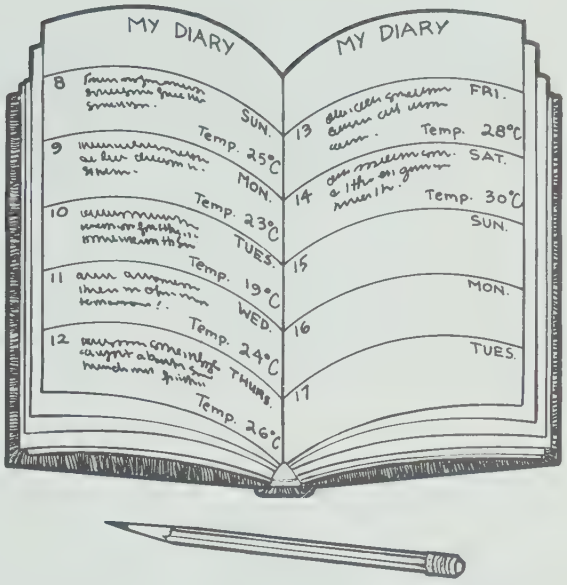
*__41.__ to match each line of this chart, if possible.

divisor	dividend	quotient
even	even	even
even	even	odd
even	odd	even
odd	even	even
even	odd	odd
odd	even	odd
odd	odd	even
odd	odd	odd

You can add, then divide to find an average.

Example:

Lucy's diary shows the temperature at noon for each day of her family's vacation trip. What was the average temperature at noon for the week?



Add.

25
23
19
24
26
28
30
175

Then divide by the number of days.

$$7\overline{)175} = 25$$

14
35
35
0

The average temperature for the week was 25°C.

Find the average.

42. Lucy's family drove 1282 km to their vacation spot and 1094 km back. What was the average distance each way?

43. Lucy caught 6 fish: 394 g, 406 g, 428 g, 476 g, 489 g, and 513 g. What was their average mass?

44. Four pieces of string were 82 cm, 68 cm, 71 cm, and 75 cm long. What was their average length?

45. On his school tests, Bob scored 89, 78, 95, 82, and 91. What was his average score on the tests?

46. During the week, it took Jack 25 min, 15 min, 19 min, 31 min, 41 min, 18 min, and 12 min to wash the dishes. What was the average length of time?

47. In the basketball games, Sue scored 42, 49, 38, 45, 18, 33, 41, and 38 points. What was her average number of points?

48. In the hockey games, Herb played for 35 min, 23 min, 37 min, 41 min, 34 min, 40 min, 44 min, 38 min, and 32 min. What was his average playing time? How many times were above average?

49. Fair attendance for one week was 5268, 2637, 3680, 4472, 2894, 5716, and 6945. What was the average attendance for each day? How many days were above the average?

Practice

Amounts of money are divided just like whole numbers.

Examples:

$$\begin{array}{r} \$\ 79 \\ 5\overline{)\$395} \\ 35 \\ \hline 45 \\ 45 \\ \hline 0 \end{array} \qquad \begin{array}{r} \$\ 1\,684 \\ 8\overline{)\$13\,472} \\ 8 \\ \hline 54 \\ 48 \\ \hline 67 \\ 64 \\ \hline 32 \\ 32 \\ \hline 0 \end{array} \qquad \begin{array}{r} \$2.43 \\ 3\overline{)\$7.29} \\ 6 \\ \hline 12 \\ 12 \\ \hline 09 \\ 9 \\ \hline 0 \end{array} \qquad \begin{array}{r} \$\ 68.42 \\ 7\overline{)\$478.94} \\ 42 \\ \hline 58 \\ 56 \\ \hline 29 \\ 28 \\ \hline 14 \\ 14 \\ \hline 0 \end{array}$$

Divide.

1. $4\overline{)\$304}$ **2.** $2\overline{)\$70}$ **3.** $5\overline{)\$160}$ **4.** $6\overline{)\$4068}$ **5.** $9\overline{)\$33\,858}$

6. $8\overline{)\$9.84}$ **7.** $5\overline{)\$5.75}$ **8.** $3\overline{)\$24.81}$ **9.** $4\overline{)\$19.92}$ **10.** $7\overline{)\$31.08}$

11. $\$72 \div 3$ **12.** $\$320 \div 5$ **13.** $\$6482 \div 7$ **14.** $\$448 \div 8$

15. $\$7.00 \div 4$ **16.** $\$85.41 \div 9$ **17.** $\$9.26 \div 2$ **18.** $\$77.70 \div 6$

Anu, Robert, and Michael earned money shovelling snow.

19. They were paid \$2.35, \$2.25, \$2.75, \$1.75, and \$2.45 for the sidewalks they shovelled. How much did they earn in all?

20. What was the average amount they earned for each job?

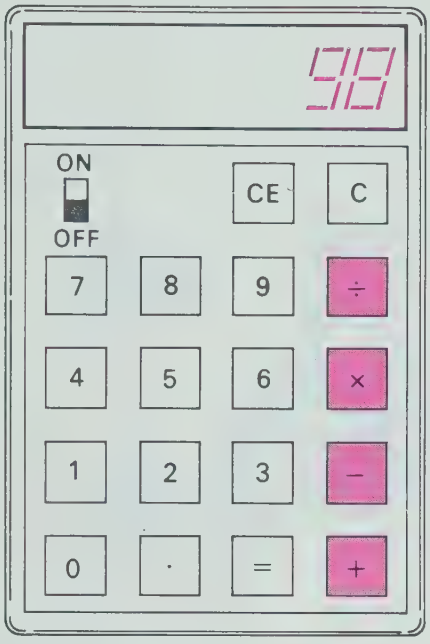
21. They shared the money equally. How much did each earn?

22. They spent 4 h in the morning and 3 h in the afternoon looking for work and shovelling. What was the average amount they earned for each hour they spent?

23. Tony earned \$5.25 for shovelling 3 walks. He earned \$1.35 for a fourth walk. Was his average for 3 walks greater than or less than his average for 4 walks?

Keycharts and the [+], [−], [×], and [÷] Keys

Keycharts can be written across or down.



98 [+] 146 [+] 179 [÷] 3 [=] ==

Yvonne had scores of 98, 146, and 179 for 3 games of bowling. What was her average score?

98
[+]
146
[+]
179
[÷]
3
[=]
==

Add, then divide by 3.

Keycharts can be different for different calculators. For the calculator you use, are these keycharts correct for finding the average of 98, 146, and 179?

Make a keychart that shows how to solve each of these.

1. What is the average distance: 1261 km, 1574 km, 928 km, 1089 km, and 1213 km?

2. How many days are there from the beginning of the year 1979 to the end of the year 1982?

3. Pearl needs to cut 9 pieces of string, all the same length, from a piece that is 774 cm long. How long can each piece be?

4. Mrs. Hoy earned $277 for each of 4 weeks. She earned $302 for a fifth week. What were her average earnings for each week?

*__5.__ 4025 names were listed in 7 columns with the same number in each column. How many names were in the last 3 columns?

*__6.__ Mr. Gibbs shared a $750 prize with 5 others. He has spent $84 of his share. How much prize money does he have left?

If you are using a calculator, be sure to make keycharts that will work for your machine.

Can you solve each problem?

Calculator

Giving the Most Reasonable Answer

Cynthia has 13 oranges for herself and 3 friends.
What is the fairest way to share the oranges?

$$\begin{array}{r} 3 \\ 4\overline{)13} \\ \underline{12} \\ 1 \end{array}$$

3 oranges for each and 1 left over

The fairest way to share the oranges would be to separate the orange left over into 4 equal parts and share them too.

Use division to solve each of these. Tell what you would do with the remainder to get the most reasonable answer.

1. Greg has 1000 apples that he must wrap for trays that hold 6 each. How many trays will he need for the 1000 apples?

2. Each car can carry 5 people. 82 people are going. How many cars are needed?

3. 75 535 people attended 9 games. What was the average number for each game?

4. Each batch of cookies uses 2 eggs. How many batches could be made with 13 eggs?

5. The 8 boys earned $34 that they wanted to share equally. How much should each boy get?

6. Irma took 25 min to read 4 pages. What was her average time for reading a page?

7. Matt plans to read the same number of pages each day for a week. There are 200 pages. How many should he read each day?

PROBLEM SOLVING

Checking Up

Divide.

1. $5\overline{)35}$ **2.** $4\overline{)24}$ **3.** $9\overline{)36}$ **4.** $7\overline{)49}$

5. $3\overline{)29}$ **6.** $2\overline{)17}$ **7.** $6\overline{)20}$ **8.** $8\overline{)52}$

9. $2\overline{)46}$ **10.** $4\overline{)84}$ **11.** $3\overline{)936}$ **12.** $2\overline{)624}$

13. $3\overline{)78}$ **14.** $5\overline{)90}$ **15.** $2\overline{)91}$ **16.** $6\overline{)70}$

17. $4\overline{)268}$ **18.** $7\overline{)903}$ **19.** $9\overline{)529}$ **20.** $5\overline{)683}$

21. $3\overline{)2022}$ **22.** $8\overline{)17\,560}$ **23.** $6\overline{)7970}$ **24.** $7\overline{)45\,071}$

25. $5\overline{)\$860}$ **26.** $9\overline{)\$6525}$ **27.** $3\overline{)\$5.94}$ **28.** $8\overline{)\$34.80}$

29. $42 \div 6$ **30.** $18 \div 3$ **31.** $30 \div 4$ **32.** $61 \div 9$

33. $36 \div 3$ **34.** $86 \div 2$ **35.** $484 \div 4$ **36.** $264 \div 2$

37. $91 \div 7$ **38.** $71 \div 4$ **39.** $734 \div 2$ **40.** $851 \div 3$

41. $470 \div 5$ **42.** $342 \div 8$ **43.** $6308 \div 4$ **44.** $9280 \div 7$

45. $4473 \div 9$ **46.** $4343 \div 6$ **47.** $31\,285 \div 5$ **48.** $60\,209 \div 8$

49. $\$336 \div 4$ **50.** $\$5201 \div 7$ **51.** $\$8.94 \div 6$ **52.** $\$89.55 \div 9$

Solve.

53. The 4 children shared 176 peanuts equally. How many peanuts did each child get?

54. The seed packet said that the seeds would produce fruit in 91 d. How many weeks is this?

55. Mr. Tompkins earned the same amount of money each day for 5 d. His paycheck was $370. How much did he earn each day?

56. The 8 children shared $18.80 equally. How much money did each child get?

57. When 520 building blocks are shared equally by 3 children, how many will each child get? How many will be left over?

58. When 175 dominoes are shared equally by 6 children, how many will each child get? How many will be left over?

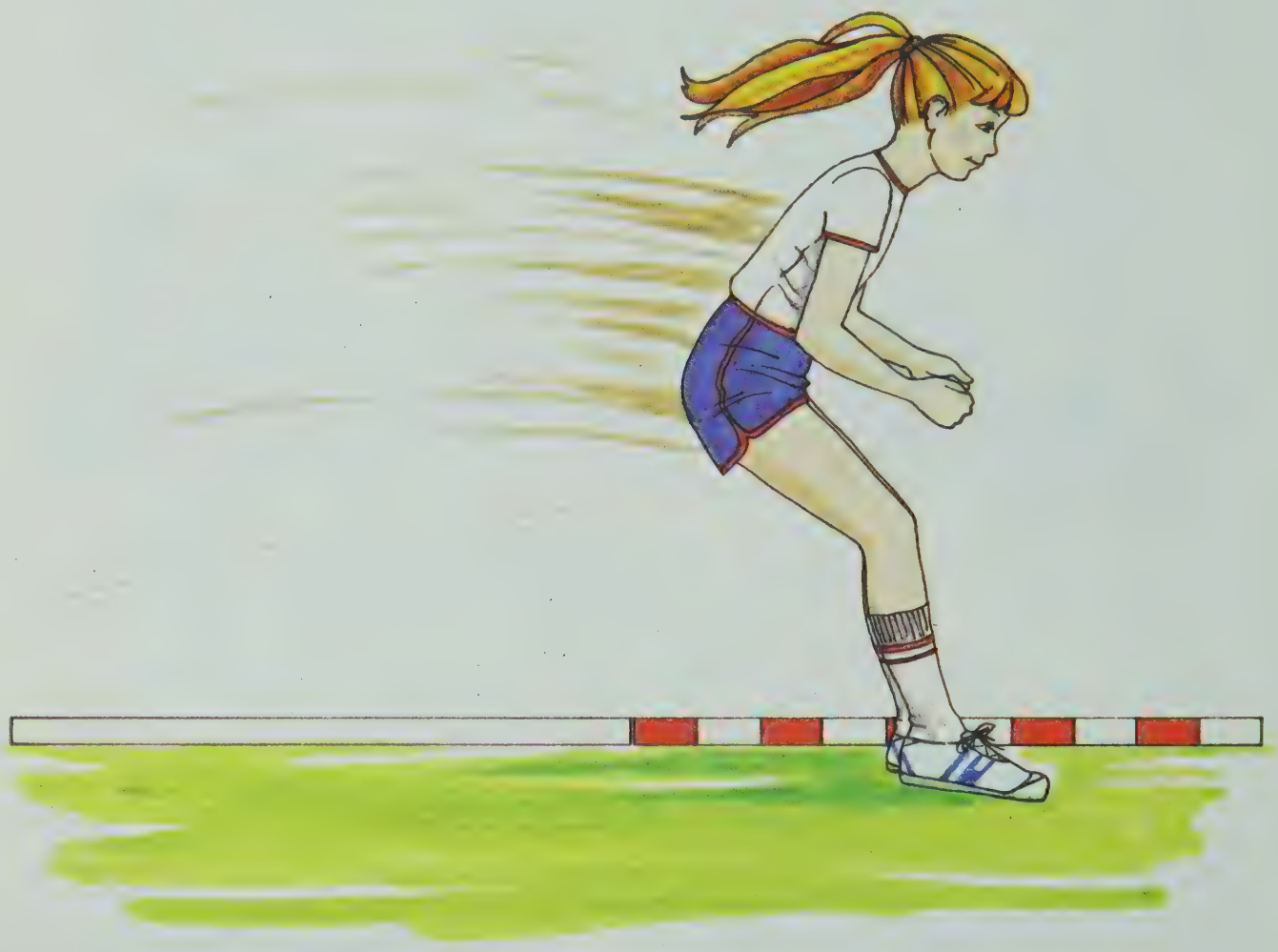
59. The 7 boys stood on the scale. It showed 238 kg. What was the average mass of each boy?

60. The girls measured their heights to be 128 cm, 143 cm, 138 cm, and 147 cm. What was their average height?

6 DECIMALS

Using Decimals to Show Tenths

Erin is trying the standing long jump in the Canada Fitness Awards tests. How far did she jump?



Erin jumped past 1 metre stick and 4 of 10 equal parts of another.

1 m (metre) and 4 of 10 equal parts of another metre is 1.4 m.

Erin jumped 1.4 m.

1.4 is a **decimal**.

The . is a **decimal point**.

When you read a decimal, say "and" for the decimal point. Erin jumped one *and* four-tenths metres.

A decimal with one digit to the right of the decimal point is a **one-place decimal**.

A one-place decimal shows how many wholes and how many tenths of another whole there are.

Working Together

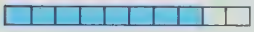
Draw place-value charts and answer these questions.

ones	tenths

1. How many wholes are there?

ones	tenths
?	

2. How many tenths are there?



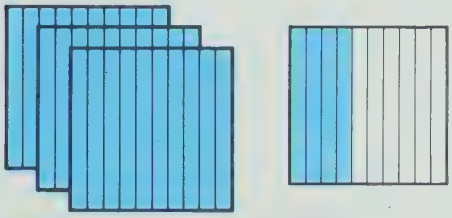
ones	tenths
	?

3. How many wholes and tenths are there?

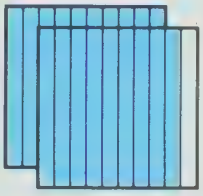
ones	tenths
?	?

How many wholes and how many tenths are there? Write the one-place decimal for each.

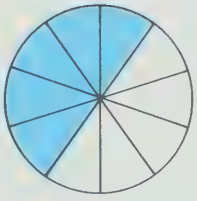
4.



5.



6.



Write the one-place decimals.

7. three and two-tenths **8.** nine-tenths

Write the words.

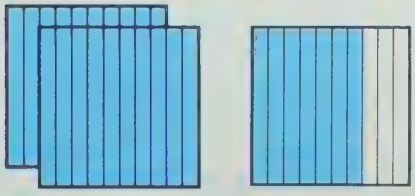
9. 1.7 **10.** 0.3

Exercises

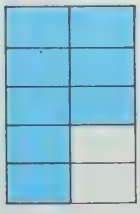
How many wholes and how many tenths are there? Write the one-place decimal for each.

1.

2.



3.



4.

Write the one-place decimals.

	ones	tenths
5.	9	5

	ones	tenths
6.	0	7

7. four-tenths

8. twelve and one-tenth

Write the words.

9. 3.9 **10.** 0.2

11. 8.8 **12.** 10.4

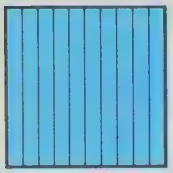
Using Decimals to Show Hundredths

A decimal shows how many wholes and how many parts of another whole there are.

1 whole

ones
1

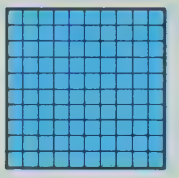
1 whole with 10 equal parts



ones	tenths
1	0

1.0 or 10 tenths

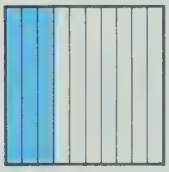
1 whole with 100 equal parts



ones	tenths	hundredths
1	0	0

1.00 or 100 hundredths

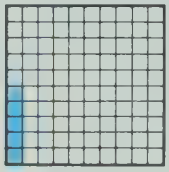
3 of 10 equal parts of a whole



ones	tenths
0	3

0.3 or 3 tenths

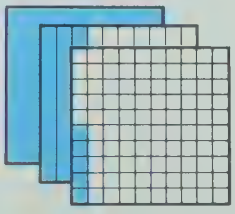
5 of 100 equal parts of a whole



ones	tenths	hundredths
0	0	5

0.05 or 5 hundredths

1 whole and 3 tenths 5 hundredths

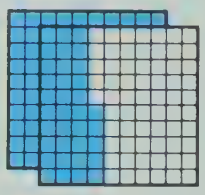


1
0.3
0.05
1.35

ones	tenths	hundredths
1	3	5

or

1 and 35 hundredths



3 tenths = 30 hundredths

1.35 1 and 35 hundredths

The decimal 1.35 stands for 1 whole and 35 of 100 equal parts of another whole.

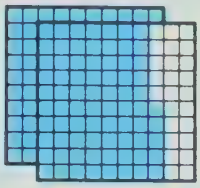
It also shows that there are 135 hundredths in all.

A decimal with two digits to the right of the decimal point is a **two-place decimal**.

A two-place decimal shows how many wholes and how many hundredths of another whole there are.

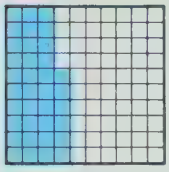
Working Together

How many wholes and how many hundredths are there?

1. 

ones	tenths	hundredths
1	7	5

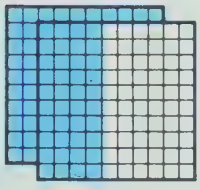
or 1 one and 75 hundredths

2. 

ones	tenths	hundredths
0	3	6

or ⋮ ones and ⋮ hundredths

Write the two-place decimal for each of these.

3. 

ones	tenths	hundredths
4. 0	0	5

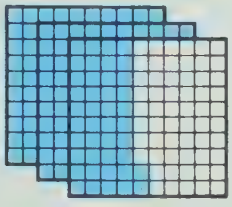
5. one and seven-hundredths
6. 12 and 25 hundredths

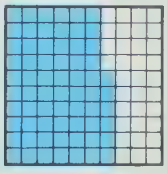
Write using words.

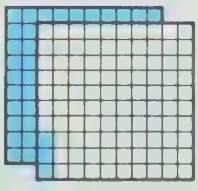
7. 3.59
8. 0.67
9. 11.01

Exercises

How many wholes and how many hundredths are there?
Write the two-place decimal for each.

1 

2. 

3. 

Write the two-place decimals.

ones	tenths	hundredths
4. 2	0	9

6. 10 and 75 hundredths

ones	tenths	hundredths
5. 0	2	5

7. three and six-hundredths

Write using words.

Example: 4.12 can be written "four and twelve-hundredths" or "4 and 12 hundredths".

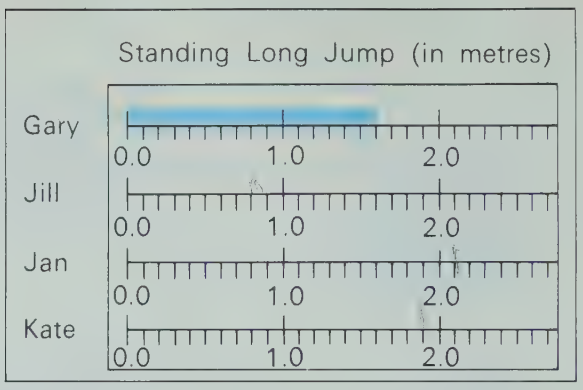
8. 7.33 **9.** 4.04 **10.** 13.99 **11.** 5.10 **12.** 0.02 **13.** 21.12

Practice

Draw and color number lines to show how far each student jumped.

1.

Standing Long Jump			
Gary	1.6 m	Jill	0.8 m
Jan	2.1 m	Kate	1.9 m

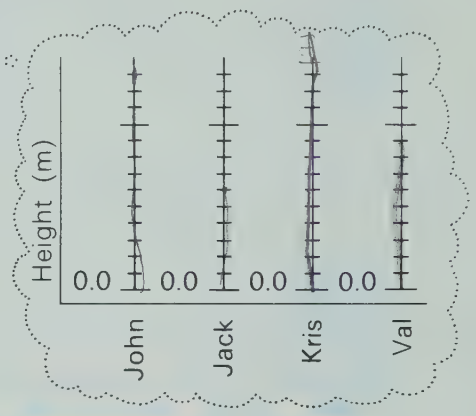


2.

Running Long Jump	
Mark	3.2 m
Theresa	2.9 m
Ian	3.5 m
Edward	4.1 m

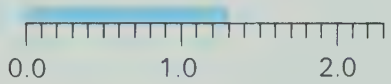
3.

High Jump	
John	1.4 m
Jack	0.6 m
Kris	1.7 m
Val	0.9 m

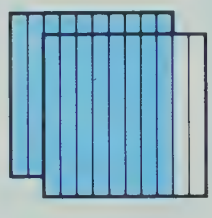


Write a one-place decimal for each of these.

4.



5.



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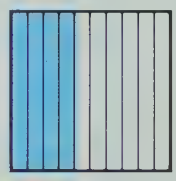


7.

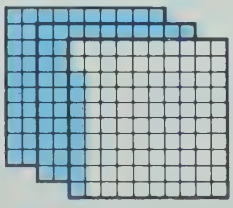
ones	tenths
2	7

8.

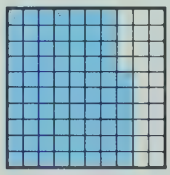
ones	tenths
0	2

Write a two-place decimal for each of these.

9.



10.



11.

ones	tenths	hundredths
3	5	0

12.

ones	tenths	hundredths
0	0	9

Write the decimals.

13. three-tenths

14. eleven-hundredths

15. one and five-tenths

16. three and nineteen-hundredths

17. 12 and 80 hundredths

18. 20 and 2 hundredths

19. 2 and 0 tenths

Write using words.

20. 0.15

21. 15.06

22. 0.7

23. 100.3

Complete.

24. In 1.7, the 7 stands for 7 __?__.

25. In 1.07, the 7 stands for 7 __?__.

Kathy Kreiner of Canada won an Olympic Gold Medal in the Giant Slalom.

Replace words with numerals, where possible, and write each sentence.

Example: Write "*two* minutes *three and forty-five hundredths* seconds" as "2 min 3.45 s".

26. Kathy's winning time was *one* minute *twenty-nine and thirteen-hundredths* seconds.

27. The second-best time was 1 min *29 and 25 hundredths* seconds.

28. Kathy's time was *twelve-hundredths* of a second faster than the second-best time.

29. In an earlier Olympics, Canada's Nancy Greene won a gold medal in this event. Her time was 1 min *51 and 97 hundredths* seconds.

30. A slalom ski can be as long as *one and seventy-five hundredths* metres.

31. A trick ski can be as short as *sixty-five hundredths* of a metre.

32. The race was won by *seven-hundredths* of a second.

33. Another skier took *one and one-hundredth* seconds longer.

Using Decimals to Show Thousandths

Elfi Schlegel's All-Around score at the Canadian National Gymnastic Championships was 75.775.

75.775 has three digits to the right of the decimal point. It is a **three-place decimal**. The three decimal places are named in this chart.

thousands	hundreds	tens	ones	tenths	hundredths	thousandths
		7	5	7	7	5

To read any decimal, use the place name of its last digit.

75.7 is "75 and 7 *tenths*".

75.77 is "75 and 77 *hundredths*".

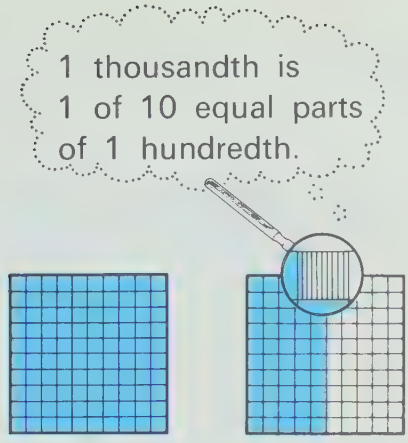
75.775 is "75 and 775 *thousandths*".

Remember that the word "and" is used for the decimal point.

Elfi's All-Around score was 75 and 775 thousandths.

Working Together

1 thousandth is
1 of 1000 equal parts of a whole.
How many wholes and how many thousandths are there?



	ones	tenths	hundredths	thousandths
1.	1	4	9	1

or 1 one and 491 thousandths

	ones	tenths	hundredths	thousandths
2.	2	0	3	8

or 2 ones and 38 thousandths

Write the three-place decimal for each of these.

3. 4 and 825 thousandths **4.** 42 and 29 thousandths **5.** five-thousandths

Write using words.

6. 0.375 **7.** 2.097 **8.** 15.008

Exercises

Write the three-place decimals.

1. one hundred twenty-five thousandths
2. 6 and 200 thousandths
3. one hundred and twenty-five thousandths
4. 5 and 18 thousandths

Write using words.

5. 3.590 **6.** 3.509 **7.** 3.059 **8.** 0.359

Think of a place-value chart. Tell what each 5 means.

tens	ones	tenths	hundredths	thousandths

Example: In 23.456, the 5 means 5 hundredths.

9. 1.568 **10.** 5.033 **11.** 11.005 **12.** 0.057 **13.** 50.505

Replace words with decimals, where possible, and write each sentence.

14. Elfi scored *18 and 975 thousandths* points on the balance beam.

15. In the floor exercises, Elfi missed a perfect score of 20 by *875 thousandths* of a point.

Comparing Decimals

Al scored 18.4 on the rings and 18.375 on the parallel bars.

In which event did he have a better score?

18.4 is the same as 18.400.

Study the digits from the left.

18.400 } show the same number of tens
18.375 } and the same number of ones.

18.400 shows 4 tenths.
18.375 shows 3 tenths.

4 is greater than 3, so
18.400 is greater than 18.375.

4 > 3, so
18.400 > 18.375.

Al had the better score on the rings.

1.2 = 1.20 = 1.200

Working Together

Write each as a two-place decimal.

1. 0.6 **2.** 2.1

0.60 2.10

Compare the whole numbers and the digits in the decimal places. Tell which decimal is greater.

5. 5.647 5.674 **6.** 13.305 13.350

Write each as a three-place decimal.

3. 1.7 **4.** 3.05

1.700 3.050

Use >, <, or = to make a true statement.

Example: 1.36 is less than 1.63, so 1.36 < 1.63.

7. 1.205 ◯ 1.052 **8.** 0.09 ◯ 0.8

Exercises

Use >, <, or = to make true statements.

1. 2.07 ◯ 2.070 **2.** 28.1 ◯ 21.8 **3.** 1.236 ◯ 12.36
4. 1.58 ◯ 1.85 **5.** 25.3 ◯ 25.003 **6.** 0.6 ◯ 0.600
7. 7.6 ◯ 7.56 **8.** 3.750 ◯ 3.75 **9.** 5.74 ◯ 54.7
10. 15.3 ◯ 15.30 **11.** 0.408 ◯ 0.48 **12.** 10.54 ◯ 10.457

Ordering Decimals

Who had the greatest score on the parallel bars?

Al scored 18.375

Beau scored 18.55

Cy scored 18.5

To compare 18.375, 18.55, and 18.5,
first think of each as a three-place decimal.

$$18.375 = 18.375$$
$$18.55 = 18.550$$
$$18.5 = 18.500$$

Then, start from the left and look at the digits place by place.

1 8 . 3 7 5	1 8 . 3 7 5	1 8 . 3 7 5
1 8 . 5 5 0	1 8 . 5 5 0	1 8 . 5 5 0
1 8 . 5 0 0	1 8 . 5 0 0	1 8 . 5 0 0
same, same	18.375 is the least.	18.550 is the greatest.

Beau had the greatest score on the parallel bars.

Turn the page for more work with ordering decimals.

Working Together

Write the numerals so that they show the same number of decimal places.

1.

0.3	0.770	
1.15		0.6

2.

0.79	0.821	
0.5		0.20

List from greatest to least.

3. 0.23, 0.203, 2.2, 0.3

List from least to greatest.

4. 1.5, 1, 0.515, 1.51

Exercises

List from greatest to least.

1. 2.18, 2.81, 2.09

2. 19.7, 1.97, 197, 0.197

3. 1.2, 2.012, 1.201, 1.21

4. 0.6, 0.64, 0.46, 0.646

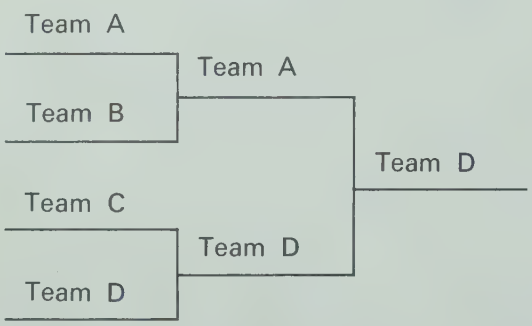
List from least to greatest.

5. 5.747, 5.745, 5.774

6. 2.3, 2.23, 2.203, 3.02

7. 0.491, 0.05, 0.50, 0.150

8. 10.408, 10.84, 12.4, 10.4



This *bracket* shows how 4 teams were paired in the soccer tournament. It shows Team A defeated Team B, and Team D defeated Team C. Then Team D defeated Team A for the championship.

1. Make a bracket that will pair 8 teams for a softball tournament.

2. 15 students are entered in the wrist-wrestling tournament. Make a bracket for the 15.

3. 17 students are entered in the table-tennis tournament. Two of them will play at a time. Make a bracket for the 17.

4. 25 students are entered in the dominoes tournament. Three students will play in each game. Each game will have one winner. Make a bracket for this tournament.

PROBLEM SOLVING

Practice

Write the decimals.

1. twenty and five-tenths

2. 205 thousandths

3. two hundred and five-thousandths

4. 2 and 5 hundredths

Write using words.

5. 5.180 **6.** 0.518 **7.** 5.018 **8.** 500.8

Tell what each 3 means. Tell what each 0 means.

9. 0.123 **10.** 1.234 **11.** 12.34 **12.** 3.06 **13.** 0.730 **14.** 1.005

Complete.

15.	one-place decimal	0.7	?	?	10.5		
16.	two-place decimal	?	1.60	?	?	2.57	?
17.	three-place decimal	?	?	0.300	?	?	1.360

Use >, <, or = to make true statements.

18. 15.85 ◯ 15.580 **19.** 4.600 ◯ 4.6 **20.** 6.083 ◯ 6.308

21. 3.842 ◯ 37.42 **22.** 12.50 ◯ 12.050 **23.** 20.02 ◯ 20.020

List from greatest to least.

24. 8.723, 8.732, 8.727, 8.372 **25.** 0.23, 2.03, 0.023, 2.3

List from least to greatest.

26. 11.11, 11.101, 11.011, 11.1 **27.** 1.043, 0.134, 0.143, 1.034

Copy and complete each pattern.

28. 1.06, 1.07, 1.08, ▢, ▢, ▢ **29.** 1.6, 1.7, 1.8, ▢, ▢, ▢

30. 2.041, 2.031, 2.021, ▢, ▢, ▢ **31.** 20.4, 20.3, 20.2, ▢, ▢, ▢

32. 0.356, 0.357, 0.358, ▢, ▢, ▢ **33.** 3.504, 3.503, 3.502, ▢, ▢, ▢

Write a decimal for the point marked with an arrow.

34.

35.

36.

37.

Rounding Decimals

Canada's Arnie Boldt set a world record of 1.90 m in the high jump event. Is 1.90 closer to 1 or to 2?

To *round* a decimal to the nearest whole number,

ones | tenths | hundredths

this place

check the digit in the tenths place.

ones | tenths | hundredths

this place

If the digit in the tenths place is 5, 6, 7, 8, or 9, round up. If it is 0, 1, 2, 3, or 4, round down.

For 1.90, the digit in the tenths place is 9.

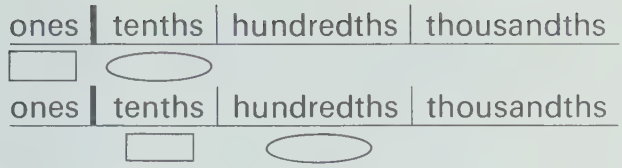
Round 1.90 up.

1.90 rounded to the nearest whole number is 2.

The high jump bar that Arnie Boldt jumped was about 2 m above the ground.

Working Together

When rounding to this place, first check the digit in this place.



1. When rounding to the nearest one, check the digit in the ___?___ place.

2. When rounding to the nearest tenth, check the digit in the ___?___ place.

If the digit you check is 5, 6, 7, 8, or 9, round up.
If the digit you check is 0, 1, 2, 3, or 4, round down.

Would you round down or up to the nearest whole number?

3. 6.125 **4.** 2.5

Would you round down or up to the nearest tenth?

5. 0.68 **6.** 1.349

Round to the nearest whole number.

7. 6.125 **8.** 2.5

Round to the nearest tenth.

9. 0.68 **10.** 1.349

Exercises

Round to the nearest whole number.

1. 2.4 **2.** 3.7 **3.** 5.5 **4.** 10.2 **5.** 2.37
6. 8.69 **7.** 12.45 **8.** 0.902 **9.** 5.499 **10.** 9.723

Round to the nearest tenth.

11. 2.46 **12.** 6.02 **13.** 1.35 **14.** 0.54 **15.** 3.98
16. 1.907 **17.** 8.089 **18.** 0.095 **19.** 10.748 **20.** 1.250

Add.

1. 1644 + 528 **2.** 28 572 + 36 946

3. 2 576 + 11 528
4. 384 + 576 + 402
5. 716 + 1839 + 52
6. $392 + $7168 + $3453
7. $1.48 + $3.68 + $5.88

Subtract. Add to check.

8. 315 − 83 **9.** 2136 − 439

10. 8374 − 3959
11. 30 103 − 4 117
12. $2000 − $1562
13. $38.43 − $18.68

Example: 453 − 298 = 155 → 155 + 298 = ?

This sum should match the first number in the subtraction.

KEEPING SHARP

Practice

Round to the nearest whole number.

1. 3.5 **2.** 4.98 **3.** 12.009
4. 9.59 **5.** 6.05 **6.** 2.455

Round to the nearest tenth.

7. 2.24 **8.** 0.816 **9.** 6.009
10. 5.25 **11.** 3.09 **12.** 1.97

Complete.

		Nearest tenth	Nearest whole number
13.	3.48	?	?
14.	10.905	?	?
15.	1.53	?	?
16.	7.059	?	?
17.	19.96	?	?

Use >, <, or =
to make true statements.

18. 8.4 ◯ 8.084
19. 2.065 ◯ 2.056
20. 1.06 ◯ 10.6
21. 10.606 ◯ 10.66
22. 3.050 ◯ 3.05
23. 0.32 ◯ 0.032

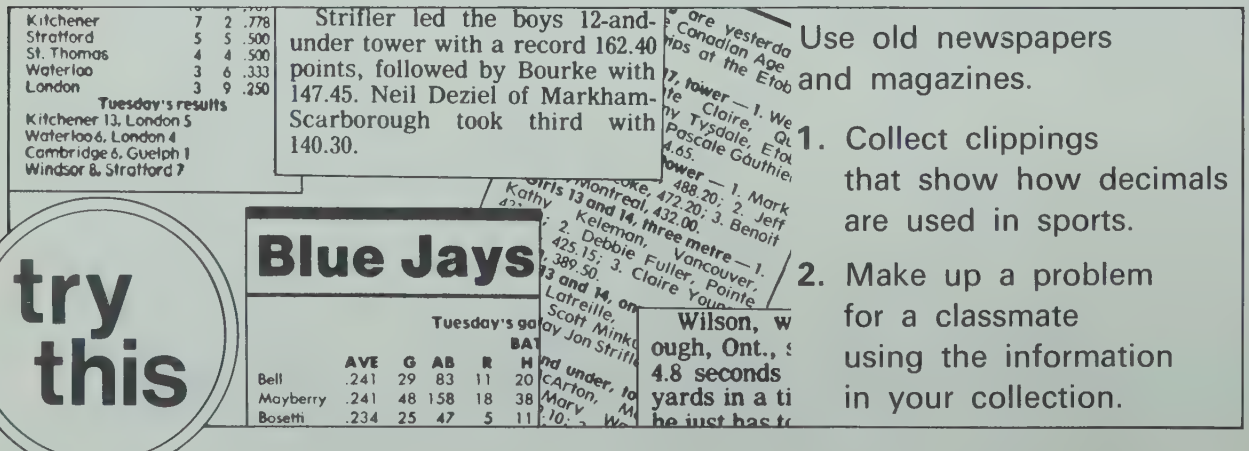
Use the chart at the top of the next page to help you answer these.

24. Curt did 45 speed sit-ups. What level did he reach?

25. Curt ran the sprint in 9.5 s. What level did he reach?

26. Debbie's time was 11.75 s in the shuttle run. What level did she reach?

try this



Strifler led the boys 12-and-under tower with a record 162.40 points, followed by Bourke with 147.45. Neil Deziel of Markham-Scarborough took third with 140.30.

Kitchener 7 2 .778
Stratford 5 5 .500
St. Thomas 4 4 .500
Waterloo 3 6 .333
London 3 9 .250
Tuesday's results
Kitchener 13, London 5
Waterloo 6, London 4
Cambridge 6, Guelph 1
Windsor 8, Stratford 7

Blue Jays

	AVE	G	AB	R	H
Bell	.241	29	83	11	20
Mayberry	.241	48	158	18	38
Bosetti	.234	25	47	5	11

Use old newspapers and magazines.

1. Collect clippings that show how decimals are used in sports.
2. Make up a problem for a classmate using the information in your collection.

CANADA FITNESS AWARDS

Levels of Achievement			
Test	Level	10-year-old boy	10-year-old girl
Sprint	3	7.8 s	8.0 s
	2	8.2 s	8.4 s
	1	9.1 s	9.4 s
Speed Sit-ups (in one minute)	3	42	38
	2	35	31
	1	29	23
Flexed Arm Hang	3	68 s	56 s
	2	49 s	31 s
	1	16 s	9 s
Shuttle Run	3	11.0 s	11.6 s
	2	11.8 s	12.2 s
	1	12.5 s	12.9 s
Standing Long Jump	3	1.65 m	1.57 m
	2	1.52 m	1.45 m
	1	1.40 m	1.32 m
Distance Run	3	64 s	65 s
	2	67 s	69 s
	1	74 s	78 s

AWARD OF EXCELLENCE
Level 3 or better in each test

GOLD
Level 3 or better in four tests

SILVER
Level 2 or better in four tests

BRONZE
Level 1 or better in four tests

This chart shows how Curt, Debbie, and three classmates performed in the Canada Fitness Awards tests.

	Abner	Betsy	Curt	Debbie	Ellen
Sprint	8.2s	7.9s	9.5s	8s	8.25s
Speed Sit-ups	20	38	45	20	32
Flexed Arm Hang	50s	60s	60s	55s	35s
Shuttle Run	11.0s	11.5s	10.9s	11.75s	13s
Standing Long Jump	1.5m	1.61m	1.7m	1.44m	1.6m
Distance Run	65s	65s	64s	69.5s	80s

*27. Make a chart that shows the levels reached by each of the five students in the tests.

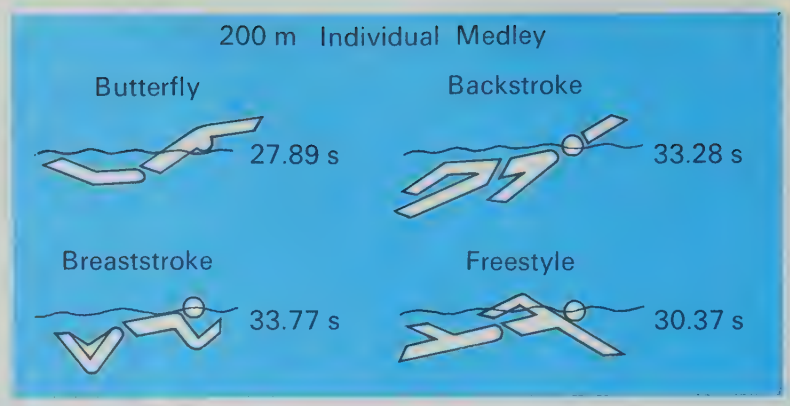
*28. Which award did each earn?

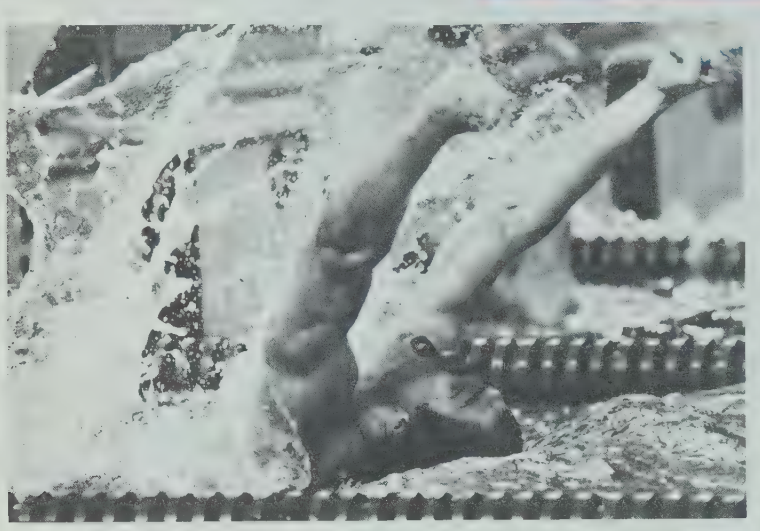
	Abner	Betsy	Curt
Sprint	2	3	0
Speed Sit-ups	0	3	
Flexed Arm Hang	2		

Curt took 9.5 s in the sprint. That was even too slow for Level 1.

Adding Decimals

The chart shows the time it took Canada's Graham Smith to swim 50 m using each stroke. His total time for the 200 m race was a world record. What was his total time?





Add 27.89, 33.28, 33.77, and 30.37.

Line up the decimals. Add hundredths and regroup.

$$\begin{array}{r} {\scriptstyle 3} \\ 27.89 \\ 33.28 \\ 33.77 \\ 30.37 \\ \hline 1 \end{array}$$

Add tenths and regroup.

$$\begin{array}{r} {\scriptstyle 2\ 3} \\ 27.89 \\ 33.28 \\ 33.77 \\ 30.37 \\ \hline 31 \end{array}$$

Add ones and regroup.

$$\begin{array}{r} {\scriptstyle 1\ 2\ 3} \\ 27.89 \\ 33.28 \\ 33.77 \\ 30.37 \\ \hline 5\ 31 \end{array}$$

Add tens.

$$\begin{array}{r} {\scriptstyle 1\ 2\ 3} \\ 27.89 \\ 33.28 \\ 33.77 \\ 30.37 \\ \hline 125.31 \end{array}$$

Place the decimal point in the sum in line with those in the addends.

Graham Smith swam the 200 m in 125.31 s.

There are 60 s in 1 min. 125.31 s equals 2 min 5.31 s.

Working Together

Line up the decimals in vertical form.

1. 22.54 + 17.67 + 23.61

2. 1.607 + 2.308 + 11.905

3. 17.1 + 16.9 + 22.7

4. 7.05 + 6.98 + 7.17

Add by following the steps.

5.

$$\begin{array}{r} 2.569 \\ +\ 3.472 \\ \hline \end{array}$$

Add thousandths and regroup.
Add hundredths and regroup.
Add tenths and regroup.
Add ones.

6.

$$\begin{array}{r} 3.047 \\ +\ 2.968 \\ \hline \end{array}$$

Add and regroup.
Add and regroup.
Add and regroup.
Add.

Exercises

Add.

1. $\begin{array}{r} 14.3 \\ +\ 17.8 \\ \hline \end{array}$ **2.** $\begin{array}{r} 12.5 \\ +\ 27.6 \\ \hline \end{array}$ **3.** $\begin{array}{r} 86.9 \\ +\ 43.8 \\ \hline \end{array}$ **4.** $\begin{array}{r} 35.6 \\ +\ 76.7 \\ \hline \end{array}$ **5.** $\begin{array}{r} 14.5 \\ +\ 107.6 \\ \hline \end{array}$

6. $\begin{array}{r} 6.45 \\ +\ 3.97 \\ \hline \end{array}$ **7.** $\begin{array}{r} 7.39 \\ +\ 6.57 \\ \hline \end{array}$ **8.** $\begin{array}{r} 4.23 \\ +\ 3.98 \\ \hline \end{array}$ **9.** $\begin{array}{r} 5.29 \\ +\ 4.87 \\ \hline \end{array}$ **10.** $\begin{array}{r} 17.74 \\ +\ 8.34 \\ \hline \end{array}$

11. $\begin{array}{r} 14.609 \\ +\ 27.098 \\ \hline \end{array}$ **12.** $\begin{array}{r} 27.639 \\ +\ 82.476 \\ \hline \end{array}$ **13.** $\begin{array}{r} 86.306 \\ +\ 29.577 \\ \hline \end{array}$ **14.** $\begin{array}{r} 92.064 \\ +\ 18.679 \\ \hline \end{array}$ **15.** $\begin{array}{r} 25.279 \\ +\ 5.791 \\ \hline \end{array}$

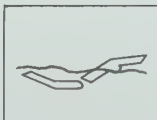
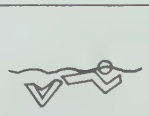
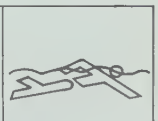
16. 2.607 + 9.703 + 5.725

17. 12.15 + 13.79 + 26.42

18. 30.1 + 407.2 + 6.8 + 29.2

19. 1.609 + 2.324 + 5.637

The chart shows the time taken to swim 50 m using each stroke.

				
Tony	28.79 s	31.46 s	36.85 s	31.90 s
Francis	29.55 s	31.27 s	35.48 s	32.88 s
Joey	28.35 s	32.17 s	36.43 s	31.94 s
Chip	31.22 s	32.80 s	33.49 s	31.65 s

20. Who used the least time for the first two strokes?

21. What was the total time for each swimmer?

22. For the 200 m race, who was first? Who was second? Who was third?

The winner is the swimmer who takes the least time.

Subtracting Decimals

The women's world record for skating 500 m is 40.80 s. Sylvia Burka holds the Canadian record of 42.15 s. How many seconds more is her time than the world record?

Subtract 40.80 from 42.15.

Line up the two decimals. Show the greater number first. Subtract hundredths.

$$\begin{array}{r} 42.15 \\ -\ 40.80 \\ \hline 5 \end{array}$$

Regroup 2 ones 1 tenth as 1 one 11 tenths. Subtract tenths.

$$\begin{array}{r} {\scriptstyle 1\ \ 11} \\ 4\not{2}.\not{1}5 \\ -\ 40.80 \\ \hline 35 \end{array}$$

Subtract ones.

$$\begin{array}{r} {\scriptstyle 1\ \ 11} \\ 4\not{2}.\not{1}5 \\ -\ 40.80 \\ \hline 1.35 \end{array}$$

Place the decimal point in line with the others.

The subtraction is complete. It can be checked by adding 1.35 and 40.80.

$$\begin{array}{r} {\scriptstyle 1} \\ 40.80 \\ +\ 1.35 \\ \hline 42.15 \end{array}$$

If this number did not match the first number used in the subtraction, there would be a mistake in the work.

Sylvia Burka's Canadian record is 1.35 s more than the world record.

Working Together

Complete each subtraction.

1. $\begin{array}{r} {\scriptstyle 3\ 13} \\ \not{4}.\not{3}5 \\ 2.91 \\ \hline 4 \end{array}$ **2.** $\begin{array}{r} {\scriptstyle 4\ 11} \\ 2.\not{5}\not{1}4 \\ 1.392 \\ \hline 2 \end{array}$ **3.** $\begin{array}{r} {\scriptstyle 11} \\ {\scriptstyle 3\ \not{1}10} \\ 1\not{4}.\not{2}\not{0} \\ 9.52 \\ \hline 8 \end{array}$ **4.** $\begin{array}{r} {\scriptstyle 113} \\ 5.4\not{2}\not{3} \\ 1.876 \\ \hline \end{array}$ **5.** $\begin{array}{r} {\scriptstyle 8\ 9\ 915} \\ \not{9}.\not{0}0\not{5} \\ 7.597 \\ \hline \end{array}$

Complete the first subtraction using whole numbers.
Then complete each of the others using decimals.

6. 6352 1894 4458	**7.** 6.352 1.894	**8.** 635.2 189.4	**9.** 63.52 18.94

10. 3000 1143	**11.** 300.0 114.3	**12.** 30.00 11.43	**13.** 3.000 1.143

Subtract.

14. 5.1 3.3	**15.** 4.55 0.98	**16.** 8.703 2.760	**17.** 3.933 2.965	**18.** 2.063 0.674	**19.** 5.003 4.286

Exercises

Subtract.

1. 18.5 12.9	**2.** 75.2 19.5	**3.** 30.6 14.7	**4.** 4.34 3.58	**5.** 38.16 19.41	**6.** 15.63 9.95
7. 6.06 3.77	**8.** 7.623 1.495	**9.** 3.605 2.914	**10.** 15.205 7.325	**11.** 3.004 1.927	**12.** 6.000 1.814

13. 125.78 − 54.63 **14.** 31.4 − 29.7 **15.** 8.127 − 3.029

16. 97.035 − 8.174 **17.** 0.87 − 0.69 **18.** 5.000 − 2.394

Subtract.
Add to check.

Example:
$\begin{array}{r} 5.42 \\ -\ 1.79 \\ \hline 3.63 \end{array}$ → $\begin{array}{r} 3.63 \\ +\ 1.79 \\ \hline ? \end{array}$

This sum should match the first number in the subtraction.

19. 9.3 2.5	**20.** 2.10 0.21	**21.** 51.23 37.94	**22.** 25.00 5.06	**23.** 4.321 3.836	**24.** 3.000 0.647

Practice

Add.

1. 17.5 3.7	**2.** 9.21 9.84	**3.** 4.29 1.93	**4.** 2.357 0.944	**5.** 4.697 6.355	**6.** 91.88 8.27

Subtract.

7. 24.2 5.8	**8.** 5.13 2.36	**9.** 13.16 9.44	**10.** 4.611 3.762	**11.** 5.551 1.856	**12.** 40.00 20.38

Subtract. Add to check.

13. 68.3 29.7	**14.** 8.25 4.39	**15.** 32.30 5.65	**16.** 9.445 4.486	**17.** 10.34 8.47	**18.** 1.004 0.746

Which result is better? How much better?

19.

100 m Run
10.58 s
11.06 s

20.

High Jump
1.89 m
1.98 m

21.

100 m Swim
57.28 s
60.05 s

22.

Weightlifting
208.2 kg
212.8 kg

23.

Gymnastics
67.925
76.295

24.

Batting Average
0.318
0.333

Read the directions carefully.
Use the three numbers shown. → 1.064 3.000 1.604

25. Add the greatest and least numbers. Subtract the other.

26. Subtract the least from the greatest number. Add the other

27. Add the least number to the difference of the other two.

28. Subtract the least number from the sum of the other two.

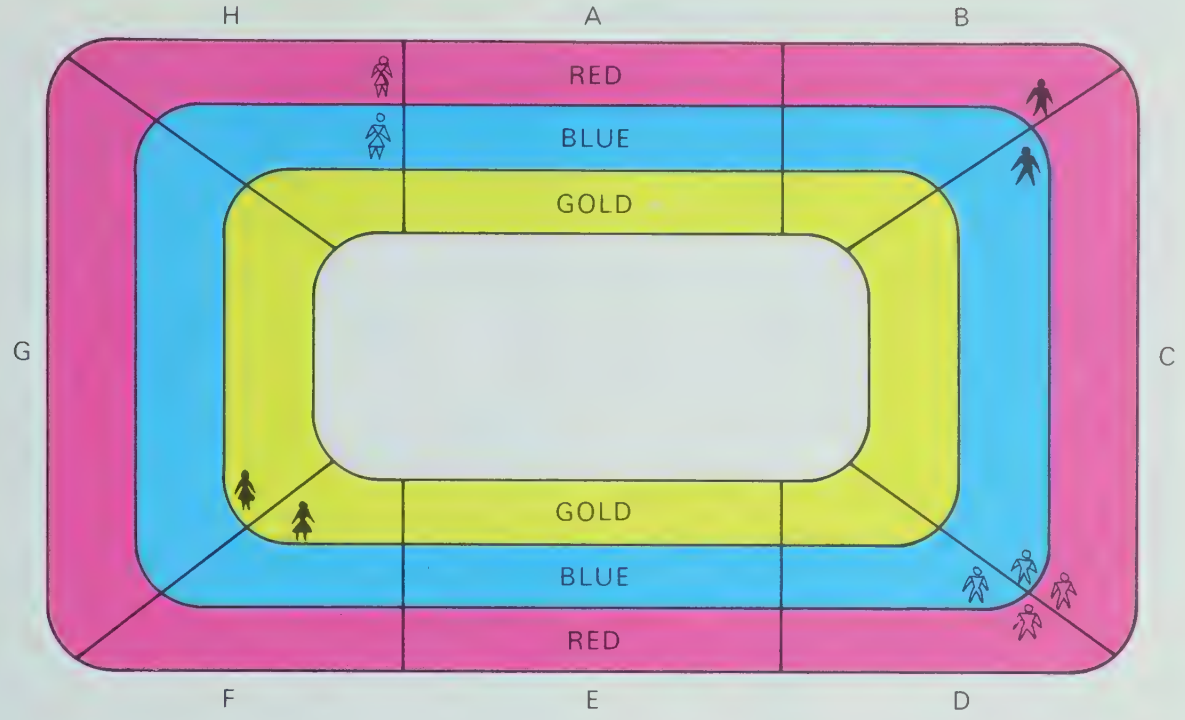
29. From the greatest number subtract the difference of the other two.

30. Add the greatest number to the difference of the other two.

31. From the greatest number subtract the sum of the other two.

32. Subtract the least number from the difference of the other two.

ARENA SEATING AND TICKET PRICES



	A	B	C	D	E	F	G	H
GOLD	$5.75	$4.75	$4.15	$4.75	$5.75	$4.75	$4.15	$4.75
BLUE	$4.40	$3.80	$3.50	$3.80	$4.40	$3.80	$3.50	$3.80
RED	$3.45	$3.15	$2.75	$3.15	$3.45	$3.15	$2.75	$3.15

Standing Room Only (behind all seating) $2.20

Children (10 and under) $0.75 off the price of each ticket

Solve.

33. Which costs more, a blue seat in Section A or a gold seat in Section C? How much more?

34. How much do two gold seats in Section F cost?

35. How much did and pay for their adult tickets?

36. How much did and pay for their adult tickets?

37. How much did and pay for their adult tickets?

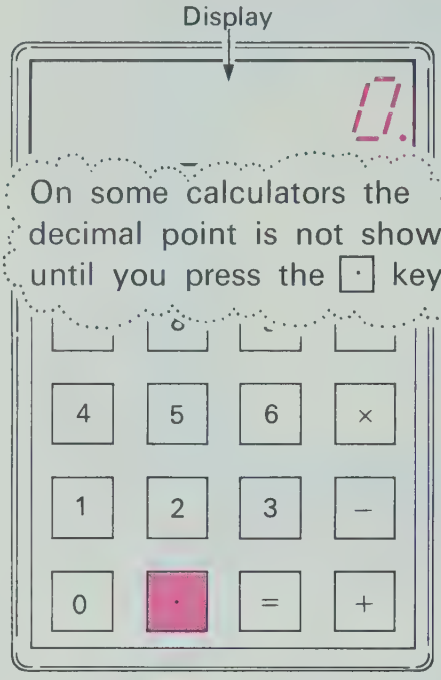
38. How much did the four pay for their adult tickets?

*__39.__ Where would you, a friend, and a parent sit? How much would your tickets cost?

*__40.__ Where could you, a friend, and a parent sit if you have only $10 to spend for tickets?

The [·] Key on a Calculator

The displays on many calculators always show a decimal point.



The [·] key lets you put the decimal point anywhere you want it.

Press, and most displays show

3	3.
9	39.
8	398.

Press, and most displays show

3	3.
·	3.
9	3.9
8	3.98

When using a calculator, how many times must you press the keys to enter each of these values?

For decimals less than 1, like 0.259, the first 0 is already displayed. The [0] key does not have to be pressed.

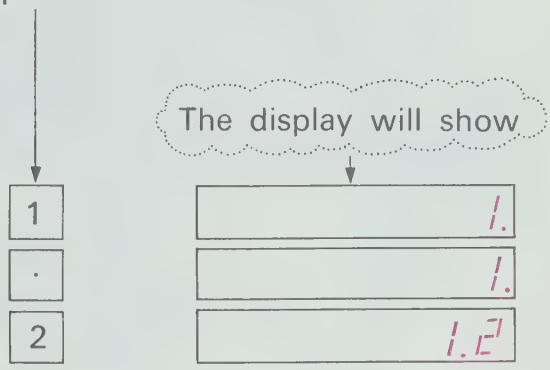
For zeros at the end of a decimal, on the right side of the decimal point, the [0] key does not have to be pressed.

Remember, 5.2, 5.20, and 5.200 all name the same number.

For amounts of money, just the decimal is entered. There is no [$] key.

1. 2.64	**2.** 35.6
3. 6.381	**4.** 457
5. 0.259	**6.** 10.64
7. 3.07	**8.** 0.008
9. 5.20	**10.** 7.180
11. 4.00	**12.** 60.0
13. 80	**14.** 0.70
15. $4.98	**16.** $10.52
17. $25	**18.** $6.50
19. $0.25	**20.** $0.90

To enter $1.20, it is enough to press



Remember, 1.2 and 1.20 name the same number.

How many times must you press the keys to solve each of these with a calculator?

Don't forget to use the [+], [−], and [=] keys when they are needed.

21. Wieners cost $1.20.
Hamburger costs $2.05.
How much do they cost together?

22. Potatoes cost $1.98.
Tomatoes cost $1.15.
How much do they cost together?

23. Hamburger costs $2.05.
Hamburger rolls cost $0.49.
How much do they cost together?

24. Mustard costs $0.45. Ketchup costs $1.00. Relish costs $0.80.
How much do they cost together?

25. Apples cost $1.80.
A melon costs 79¢.
How much do they cost together?

26. One can of beans costs 38¢.
Another costs 50¢. Chips cost 89¢.
How much do they cost together?

27. Hot dog rolls cost 49¢. How much do the potatoes, tomatoes, rolls, wieners, hamburger, mustard, ketchup, relish, apples, melon, beans, and chips cost together?

Making keycharts can help you with these exercises.

Calculator

Organizing Information

Think about where and when the teams would play in your community.

Four teams are ready to play.

1. Make up a schedule so that any team plays each of the other teams two times.
2. On your schedule show when each game will be played.
3. On your schedule show where each game will be played.
4. Is it possible for two games to be played at the same time? If so, show this in your schedule.

Two more teams, the Elves and the Flyers, are formed.

5. Make up a schedule so that any team plays each of the other teams two times. Show when and where each game will be played.

The Giants and Hawks are the seventh and eighth teams to be formed.

6. Make up a schedule so that any team plays each of the other teams one time. Show when and where each game will be played.

If you have two or more places for playing, try to make your schedule so that

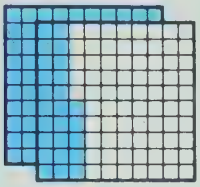
A. no team plays in the same place twice in a row, and

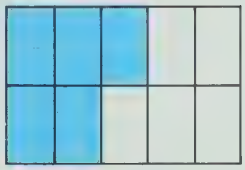
B. each team plays in each place at least one time.

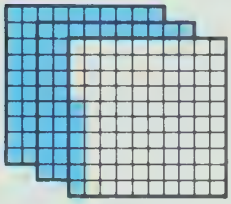
PROBLEM SOLVING

Checking Up

Write a decimal for each of these.

1. 

2. 

3. 

4.

5.

	ones	tenths	hundredths
6.	0	8	9

	ones	tenths	hundredths	thousandths
7.	7	0	0	4

8. 5 and 7 hundredths

9. 20 and 125 thousandths

Tell what each 3 means.

10. 1.375 **11.** 2.630 **12.** 0.543

Write each as a one-place decimal.

13. 6.300 **14.** 0.50

Write each as a two-place decimal.

15. 1.7 **16.** 1.030

Write each as a three-place decimal.

17. 4.4 **18.** 2.01

Use >, <, or = to make true statements.

19. 2.38 ◍ 2.6 **20.** 1.83 ◍ 1.830 **21.** 0.1 ◍ 0.095

List from greatest to least.

22. 0.689, 0.757, 0.692, 0.325

List from least to greatest.

23. 5.07, 6.2, 5.007, 6.021

Round to the nearest whole number.

24. 6.45 **25.** 8.5 **26.** 2.085

Round to the nearest tenth.

27. 6.45 **28.** 3.728 **29.** 4.095

Add.

30.
$$\begin{array}{r} 4.7 \\ +\ 8.3 \\ \hline \end{array}$$

31.
$$\begin{array}{r} 1.43 \\ +\ 3.97 \\ \hline \end{array}$$

32.
$$\begin{array}{r} 13.42 \\ +\ 6.89 \\ \hline \end{array}$$

33.
$$\begin{array}{r} 3.698 \\ +\ 0.384 \\ \hline \end{array}$$

34.
$$\begin{array}{r} 5.735 \\ 0.849 \\ +\ 3.621 \\ \hline \end{array}$$

Subtract.

35.
$$\begin{array}{r} 7.0 \\ -\ 2.9 \\ \hline \end{array}$$

36.
$$\begin{array}{r} 6.14 \\ -\ 5.96 \\ \hline \end{array}$$

37.
$$\begin{array}{r} 13.02 \\ -\ 2.19 \\ \hline \end{array}$$

38.
$$\begin{array}{r} 3.525 \\ -\ 1.929 \\ \hline \end{array}$$

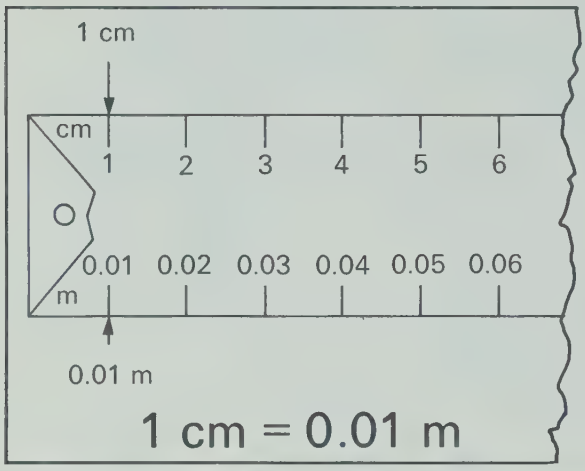
39.
$$\begin{array}{r} 1.002 \\ -\ 0.989 \\ \hline \end{array}$$

7 MEASUREMENT

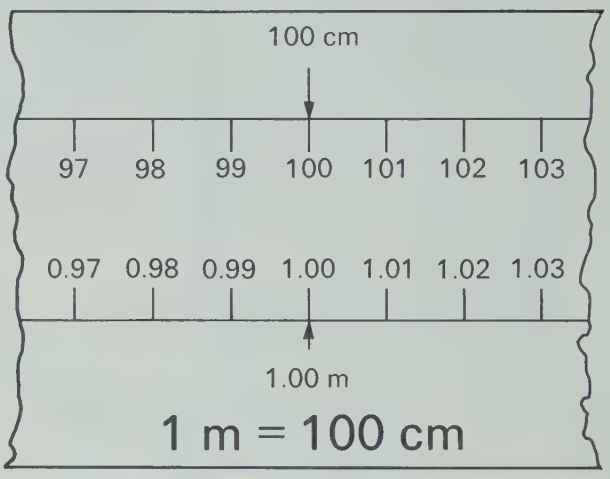
Measuring with Metres or Centimetres

A centimetre is one-hundredth of a metre.

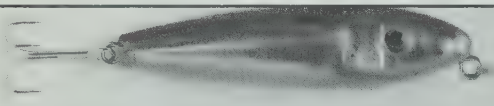
There are 100 cm in one metre.



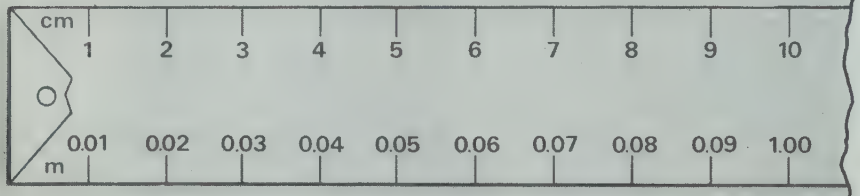
1 cm = 0.01 m



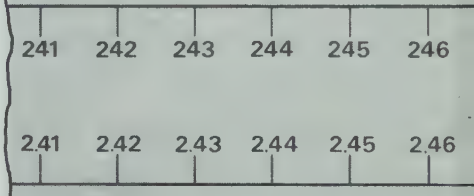
1 m = 100 cm



The fishing lure is 6 cm long.



The fishing rod is 2.44 m long.



1 cm = 1 hundredth of a metre
6 cm = 6 hundredths of a metre

6 cm = 0.06 m

The fishing lure is 6 cm or 0.06 m long.

2.44 m = 2 m and 0.44 m
2.44 m = 200 cm and 44 cm

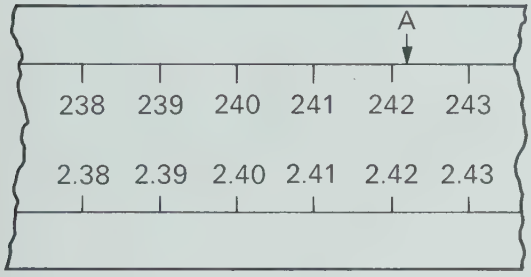
2.44 m = 244 cm

The fishing rod is 2.44 m or 244 cm long.

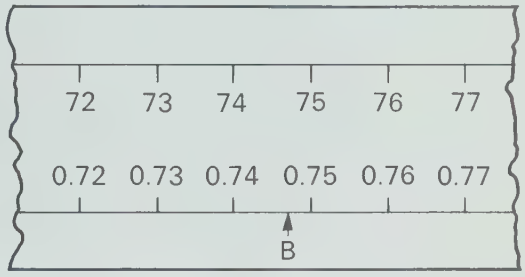
Working Together

The top edge of this measuring tape is marked in centimetres. The bottom edge is marked in metres.

1. For point A, read the tape to the nearest centimetre.



2. For point B, read the tape to the nearest hundredth of a metre.



3. For point A, read the tape to the nearest hundredth of a metre.

4. For point B, read the tape to the nearest centimetre.

Complete.

5.

cm	79	?	125	?
m	?	3.60	?	0.33

Measure the length and complete.

6.

	cm	m
the chalkboard	?	?

Exercises

Complete.

	cm	m
1.	250	?
2.	?	1.47
3.	95	?

Write each sentence. Change measurements in metres to centimetres and measurements in centimetres to metres.

4. The wallpaper in the roll was 9 m long and 0.53 m wide.

5. The pane of glass was 240 cm long and 120 cm wide.

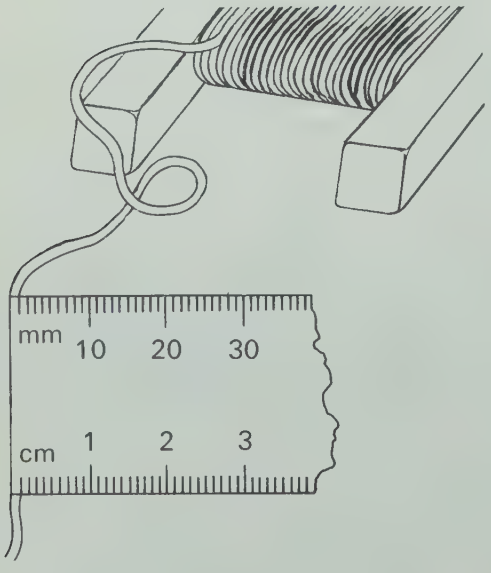
Measure to the nearest centimetre or to the nearest hundredth of a metre. Write your measurement in red. Then use black and write the measurement in the other unit.

		cm	m
6.	the length of your classroom	?	?
7.	the width of this book	?	?
8.	the height of your desk	?	?
9.	how high you can reach	?	?
10.	the distance from the door to the teacher's desk	?	?

Measuring with Millimetres

How thick is Mindy's fishing line?

Millimetres are used for measuring small things or for measuring more exactly than with centimetres.



Mindy's fishing line is about 1 mm (millimetre) thick.

A millimetre is one-tenth of a centimetre.

$$1 \text{ mm} = 0.1 \text{ cm}$$

There are 10 mm in a centimetre.

$$1 \text{ cm} = 10 \text{ mm}$$

There are 10 mm in a centimetre and 100 cm in a metre. So, there are 100 × 10 mm, or 1000 mm, in a metre. A millimetre is 0.001 m.

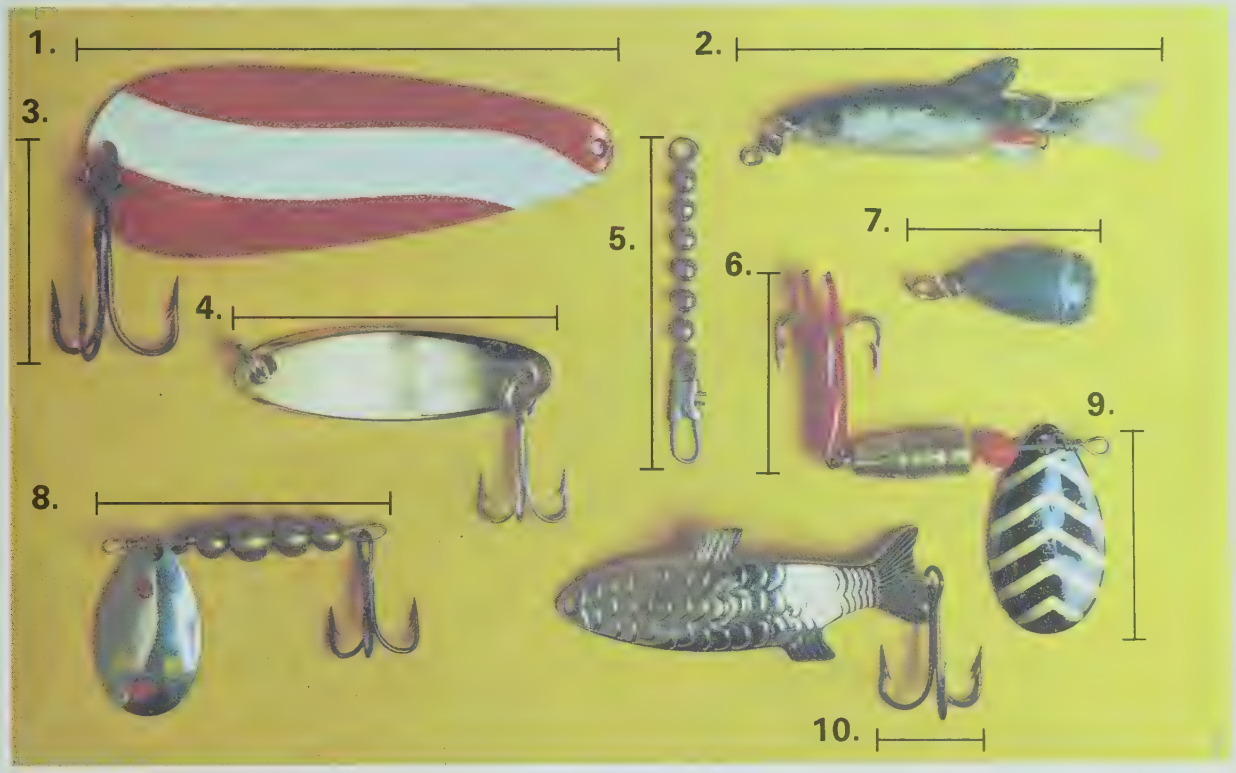
Working Together

Measure to the nearest millimetre.

1. _____ 2. 3. the sharpened end of your pencil

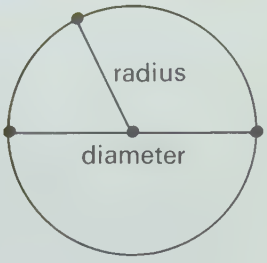
Exercises

Measure to the nearest millimetre.



A **radius** of a circle is a line segment with one end point at the centre of the circle and the other end point on the circle.

A **diameter** of a circle is a line segment having both end points on the circle and containing the centre.



Measure, to the nearest millimetre, the diameter of

11. the circle shown above.
12. the dots on a domino.
13. a button.
14. a roll of tape.
15. each hole in a pencil sharpener.
16. each kind of Canadian coin.

Measure, to the nearest millimetre, the radius of

17. the circle shown above.
18. the face of a round watch.

Metres, Centimetres, and Millimetres

Greg needs a new spoke for his bicycle.

He measured one spoke to be 31 cm long.

How many millimetres is 31 cm?

$$1 \text{ cm} = 10 \text{ mm}$$

$$31 \text{ cm} = 310 \text{ mm}$$

Each spoke is 310 mm long.

How many metres is 31 cm?

$$1 \text{ cm} = 0.01 \text{ m}$$

$$31 \text{ cm} = 0.31 \text{ m}$$

Each spoke is 0.31 m long.

Working Together

Use this chart for the exercises, if needed.

1 cm = 10 mm	1 mm = 0.1 cm
1 m = 100 cm	1 cm = 0.01 m
1 m = 1000 mm	1 mm = 0.001 m

Give each length in millimetres.

4. 4 cm **5.** 6.3 cm **6.** 3.75 m

Give each length in centimetres.

Example: 3.84 m = 3 m + 0.84 m
3.84 m = 300 cm + 84 cm
3.84 m = 384 cm

1. 1.25 m **2.** 267 mm **3.** 6 m

Give each length in metres.

7. 305 cm **8.** 2364 mm **9.** 58 cm

Exercises

Give each length in centimetres.

1. 5 m **2.** 870 mm **3.** 9.3 m
4. 8 mm **5.** 48 mm **6.** 0.5 m

Give each length in millimetres.

7. 17 cm **8.** 4.5 m **9.** 18.3 cm
10. 283 cm **11.** 92 m **12.** 6.7 cm

Give each length in metres.

13. 4674 mm **14.** 1800 cm
15. 14 cm **16.** 670 mm
17. 183 cm **18.** 7 mm

Choose a unit and measure. Write the measurement in red. Then use black and write the measurement in each of the other units.

		mm	cm	m
19.	the width of your desk	?	?	?
20.	your height	?	?	?
21.	a giant step	?	?	?
22.	the length of a hair from your head	?	?	?
23.	the width of your classroom	?	?	?
24.	the length of the nail on your little finger	?	?	?
25.	the distance from your desk to the door	?	?	?
26.	the width of one of your front teeth	?	?	?

Study these multiplications. Then complete each of these.

A. 20 × 30 = 600

1. 2 tens × 3 tens = 6 ?

B. 600 × 40 = 24 000

2. 6 hundreds × 4 tens = 24 ?

C. 50 × 800 = 40 000

3. 5 tens × 8 hundreds = 40 ?

For multiplying, in general,

4. tens × tens = ?
5. hundreds × tens = ?
6. tens × hundreds = ?

Find the product of each without using paper or pencil.

7. 40 × 40
8. 400 × 20
9. 60 × 700
10. 700 × 30
11. 20 × 50
12. 900 × 10

How many times will the digit 0 appear in each product?

13. 300 × 50
14. 70 × 700
15. 50 × 60

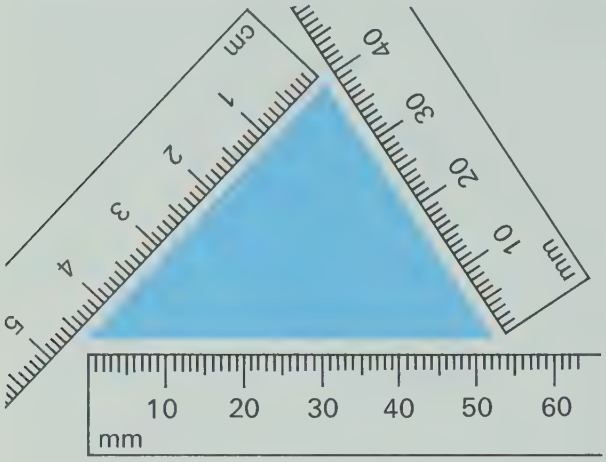
How many digits will there be in each product?

16. 91 × 79
17. 312 × 24
18. 476 × 92

KEEPING SHARP

Finding the Perimeter

The sides of the shape are
52 mm, 39 mm, and 45 mm long.



The sides of the shape are
5.2 cm, 3.9 cm, and 4.5 cm long.

Add to find the distance
around the shape.

In millimetres:	In centimetres:
52	5.2
39	3.9
45	4.5
136	13.6

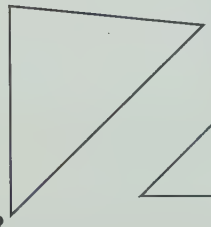
The distance around a shape
is its **perimeter**.

The perimeter of the shape
is 136 mm or 13.6 cm.

Exercises

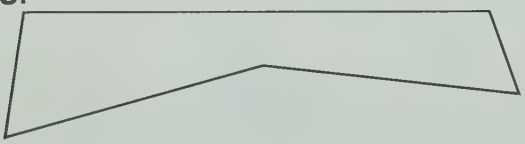
Measure each side in millimetres.
Then add to find the perimeter.

1.



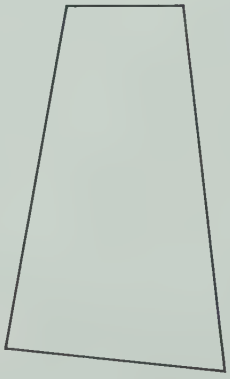
2.

3.



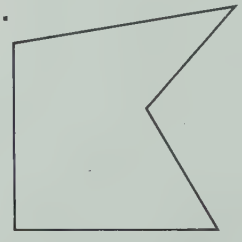
Measure each side in centimetres.
Then add to find the perimeter.

4.



Measure to the
nearest tenth
of a centimetre.

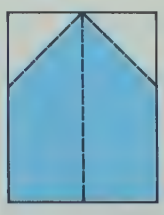
5.



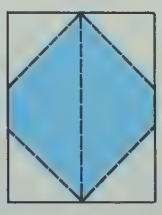
Fold a sheet of paper. Then find
the perimeter of the shaded part.

6.

7.

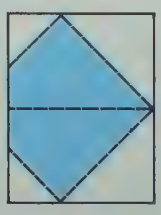


8.



9.

10.



Practice

Each length is given in one unit. Complete the chart to show the length in each of the units.

1.
14.5 cm

2.
5.64 m

3.
240 mm

	mm	cm	m
1.	?	14.5	?
2.	?	?	?
3.	?	?	?

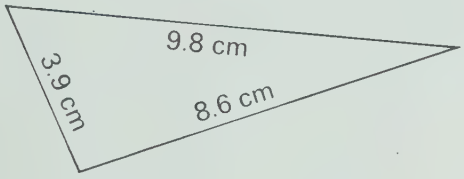
Measure each line segment in one unit. Complete the chart to show the length in each of the units.

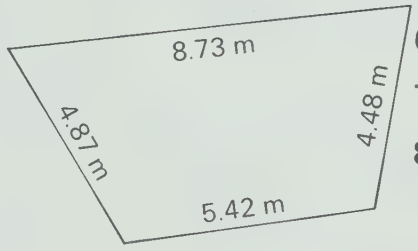
4. _____

5. _____

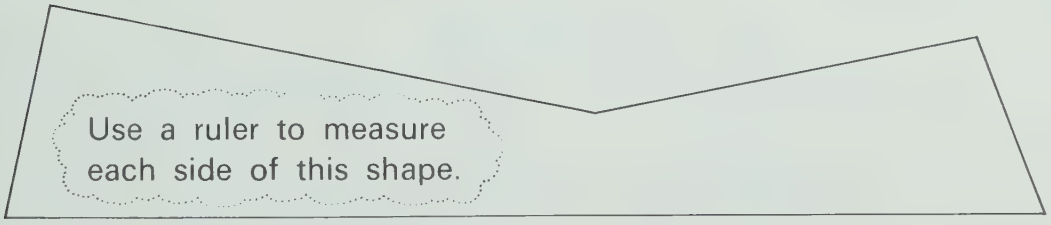
	mm	cm	m
4.	?	?	?
5.	?	?	?

Complete the chart to show perimeter in each unit.

6. 

7. 

	mm	cm	m
6.	?	?	?
7.	?	?	?
8.	?	?	?

8. 

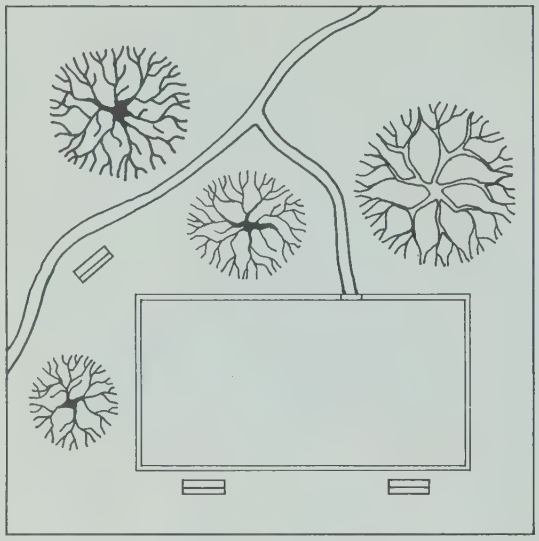
Choose a unit and measure. Write your measurement in red. Then use black and write the measurement in each of the other units.

		mm	cm	m
9.	the length of a Canadian flag	?	?	?
10.	the greatest width of your shoe	?	?	?
11.	the diameter of a telephone dial	?	?	?
12.	the perimeter of your classroom	?	?	?

When you use centimetres, measure to one decimal place.

When you use metres, measure to two decimal places.

Finding the Perimeter of a Square or a Rectangle



The skating rink has the shape of a rectangle. What is its perimeter?

Add

$75 + 40 + 75 + 40 = 230$

The perimeter of the rink is 230 m.

There are two sides of 75 m each and two sides of 40 m each.

or multiply, then add.

$(2 \times 75) + (2 \times 40) = 230$

The city park covers a square block. Each side is 118 m long. How far is it around the park?

To find the perimeter,

add or multiply.

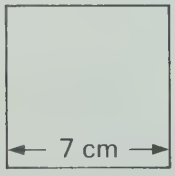
$$\begin{array}{r} 118 \\ 118 \\ 118 \\ \underline{118} \\ 472 \end{array} \qquad \begin{array}{r} 118 \\ \times\ 4 \\ \hline 472 \end{array}$$

The perimeter of the city park is 472 m.

Working Together

Complete.

1.



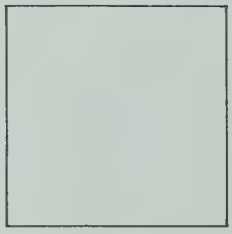
Perimeter is ▒ × 7 cm, or ▒ cm.

Measure and complete.

2.

Perimeter is 4 × ▒ mm, or ▒ mm.

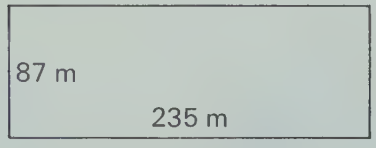
3.



Perimeter is ▒ × ▒ mm, or ▒ mm.

Complete.

4.



Perimeter is (▒ × 87 m) + (2 × ▒ m) or ▒ m.

Measure and complete.

5.

Perimeter is (▒ × ▒ mm) + (▒ × ▒ mm) or ▒ mm.

Exercises

Find the perimeter for each square or rectangle.

1.

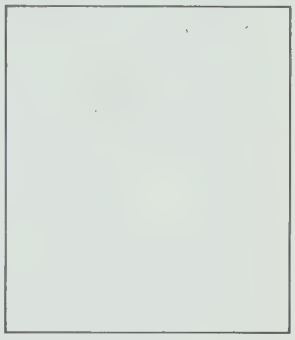
2.

3.

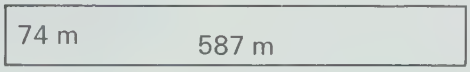
4.

Use a ruler to measure the sides of these shapes.

5.



6.



What is the perimeter

7. of a rectangle that is 18 cm long and 7 cm wide?

8. of a square with each side 3 m long?

9. of a rectangle that is 19 mm wide and 23 mm long?

*__10.__ of the picture in a slide made from 16 mm film?

Solve.

11. A yard in the shape of a rectangle has one side 15 m long and another side 18 m long. How many metres of fencing are needed for the four sides?

*__12.__ In baseball, how far must a batter travel around the bases after hitting a home run?

Tell how many digits there will be in each product. Then multiply.

1. 43 21	**2.** 306 32	**3.** 58 74	**4.** 216 89	**5.** 275 42

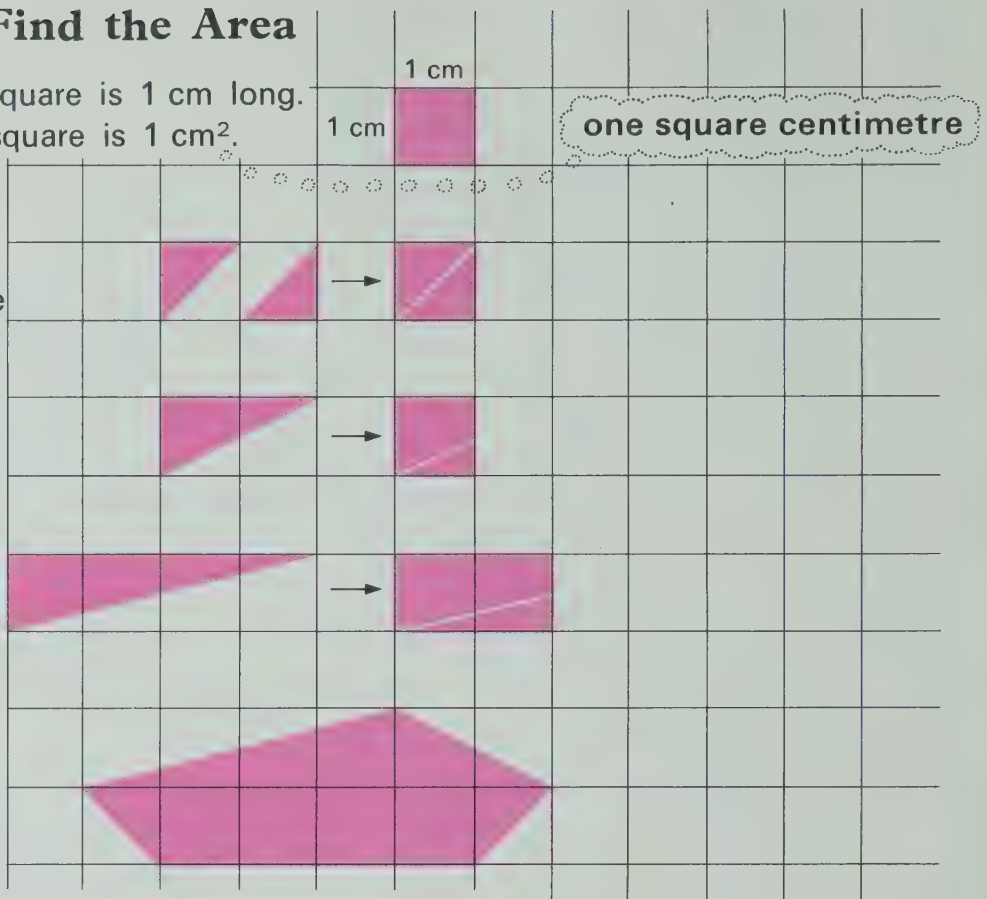
Multiply.

6. 17 52	**7.** 286 34	**8.** 394 712	**9.** 2639 865

KEEPING SHARP

Counting to Find the Area

The side of each square is 1 cm long.
The area of each square is 1 cm².



Two halves of a square centimetre equal 1 cm².

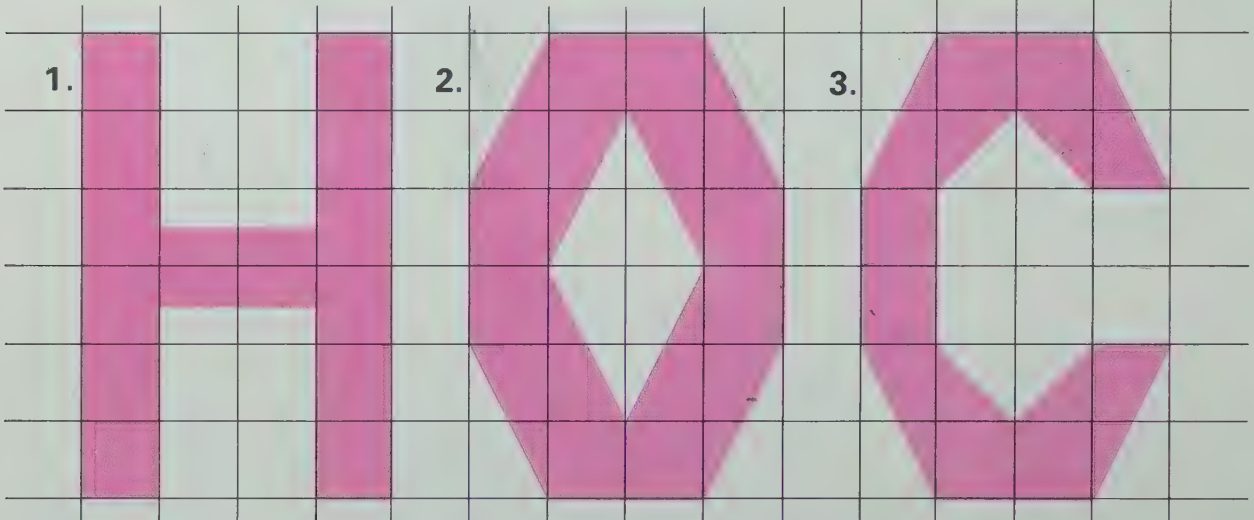
One-half of 2 cm² equals 1 cm².

One-half of 4 cm² equals 2 cm².

The area of this shape is 8 cm².

Exercises

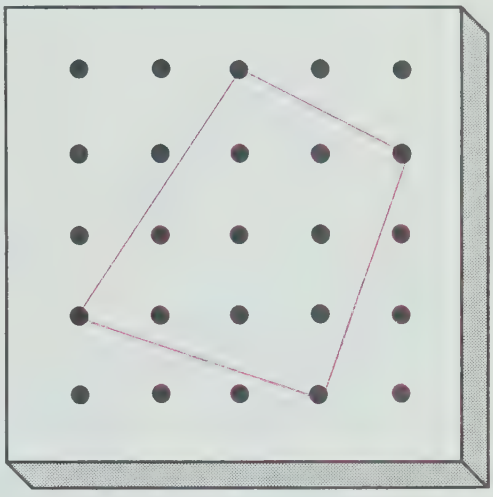
Find the area of each letter in square centimetres.



7. What is the area of the word HOCKEY? _____

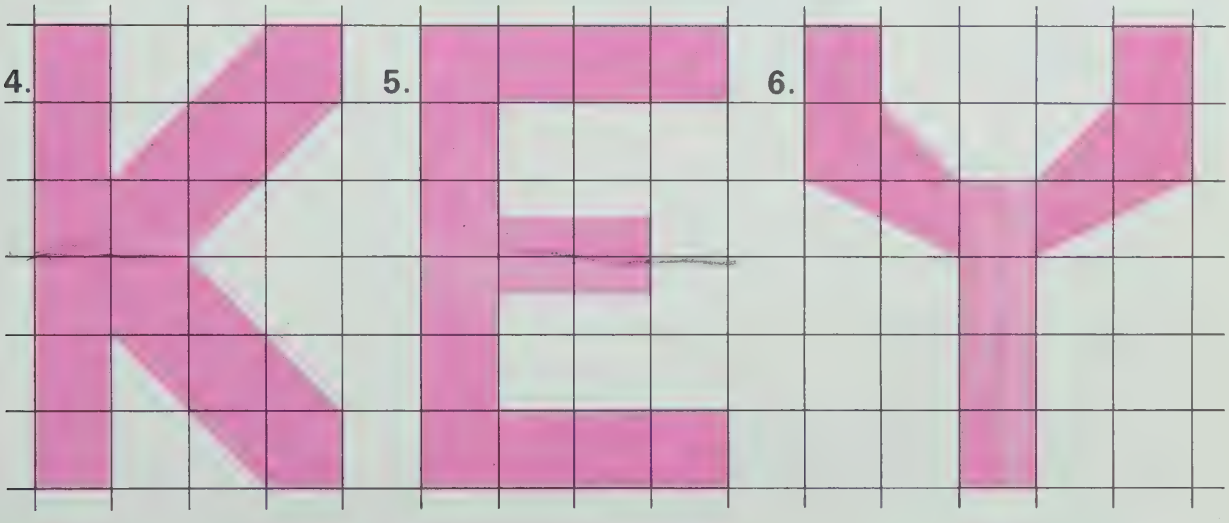
8. Use centimetre graph paper. Print a word with block letters. _____ Find the area of the letters.

Make any four-sided shape on a geoboard, dot paper, or graph paper.



Tell how you could find the number of square units inside the shape.

PROBLEM SOLVING

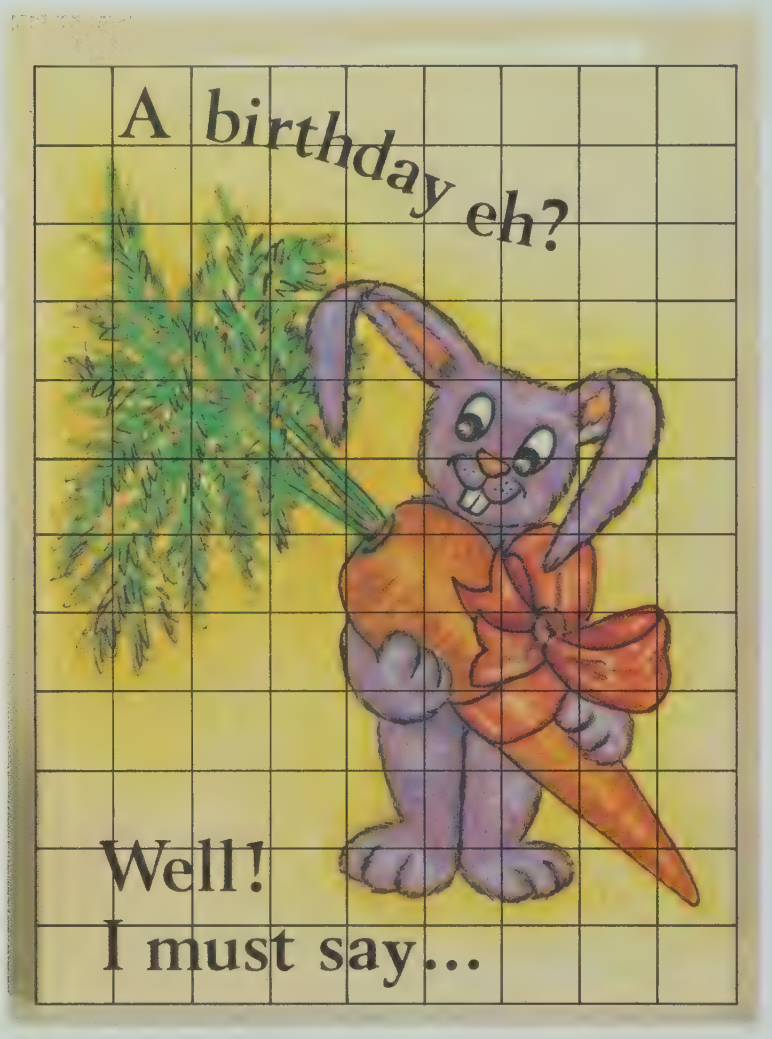


9. Cut a picture from a newspaper. Place the picture on centimetre graph paper. Find its area.

10. Place centimetre graph paper on a card. Find the area of the card.

Finding the Area of a Rectangle

The birthday card has the shape of a rectangle. For the area of the front of the card, find the number of square centimetres inside the rectangle.



Counting the squares shows there are

$$108 \text{ cm}^2$$

inside the rectangle.

Multiplying is a faster way than counting to find the area.

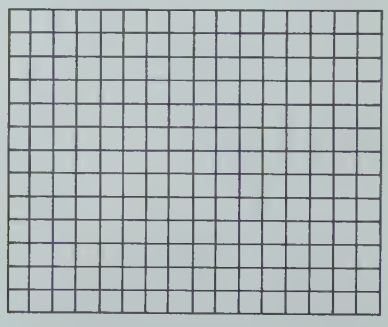
There are 12 rows of squares with 9 in each row.

$$12 \times 9 = 108$$

The area of the front of the card is 108 cm^2.

Working Together

For the small squares in this rectangle, →



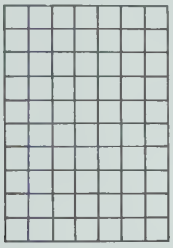
1. how many rows are there?
2. how many are in each row?
3. how many are there in all?

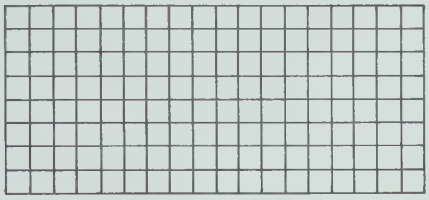
What is the area of a rectangle having

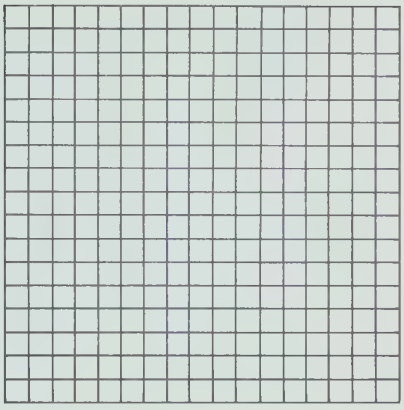
4. 16 rows of square centimetres with 8 in each row?
5. 24 rows of square centimetres with 37 in each row?

Exercises

Each small square represents 1 cm^2.
What is the area of each of these?

1. 

2. 

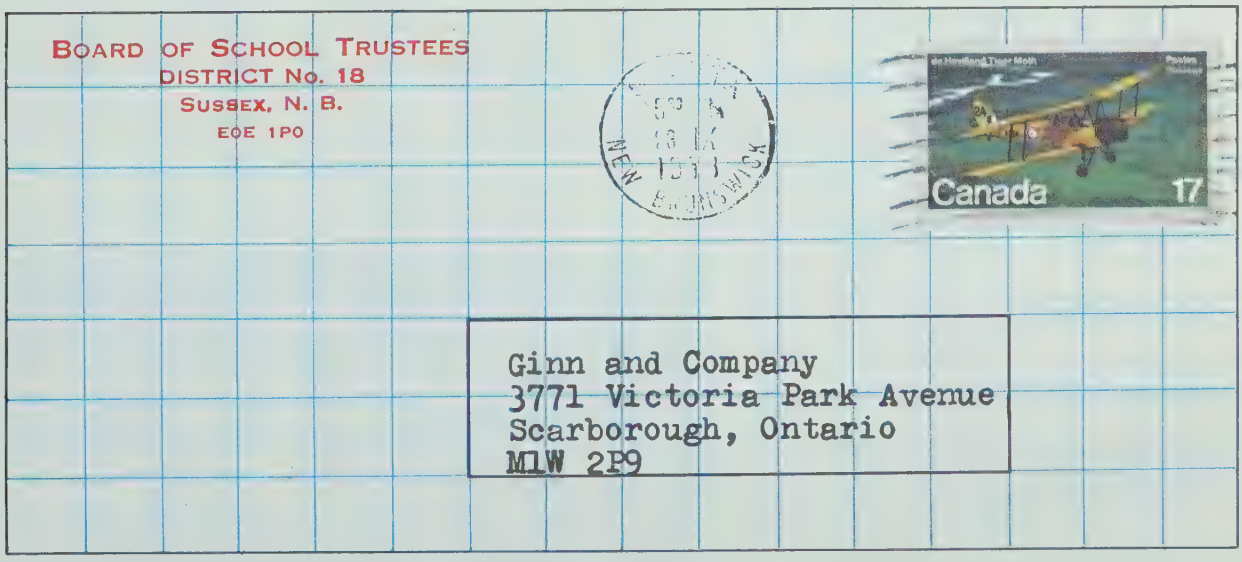
3. 

What is the area of each rectangle?

4. 7 rows of square centimetres, 19 in each row
5. 26 rows of square centimetres, 4 in each row
6. 65 rows of square centimetres, 87 in each row
7. 48 rows of square centimetres, 48 in each row

What is the area of

8. the envelope?
9. its label?
10. the part of the envelope not covered by the label?



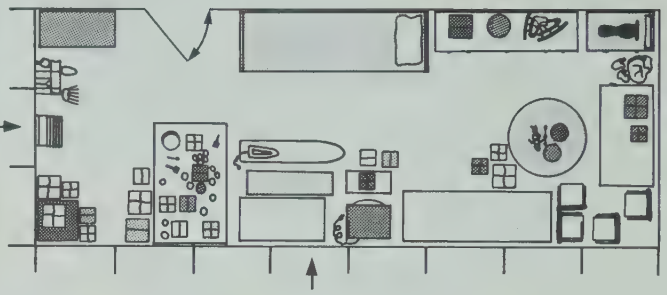
Use graph paper with centimetre squares. Draw a horizontal number line and a vertical number line starting from the same point. Find the area of the rectangle

11. with corners at (2,1), (9,1), (9,12), and (2,12).
12. with corners at (0,0), (17,0), (17,15), and (0,15).
*13. with corners at (4,0), (13,12), (9,15), and (0,3).

Finding the Area of a Rectangle by Using Its Length and Width

What is the area of the storeroom floor?

The number of units along this side of the rectangle (its width) shows how many rows of square units there are in the rectangle.



The number of units along this side of the rectangle (its length) shows how many square units there are in each row.

There are 3 rows of square units with 8 in each row.

$$3 \times 8 = 24$$

For the storeroom, each square is a square metre.

The area of the storeroom floor is 24 m^2 (square metres).

Working Together

If you were to use the centimetre marks along the sides to draw squares on this picture,

1. how many rows of squares would be in your picture?
2. how many squares would be in each row?
3. how many square centimetres would be in your picture?
4. What is the area of the rectangle?

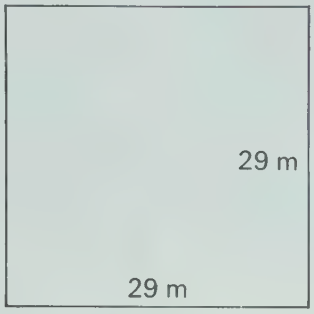
What is the area of a rectangle

5. 12 cm long and 8 cm wide?
6. 38 m long and 24 m wide?

Exercises

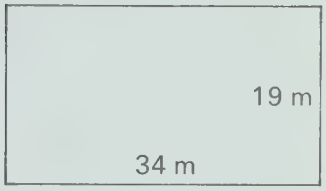
Find the area of each rectangle.

1.



2.

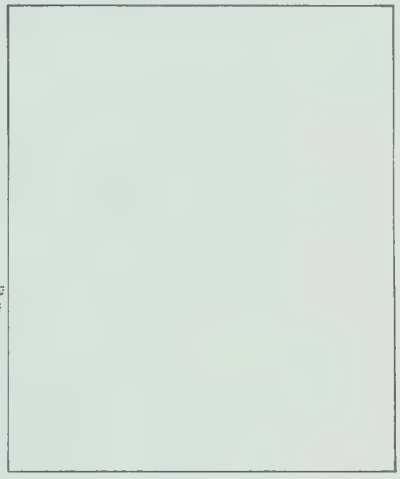
3.



4.

Use a ruler to measure the sides of these shapes.

5.



Complete.

	Length	Width	Area
6.	18 cm	9 cm	?
7.	26 m	5 m	?
8.	14 m	14 m	?
9.	32 cm	28 cm	?
10.	66 m	44 m	?
11.	50 cm	35 cm	?
12.	37 cm	37 cm	?
13.	125 m	125 m	?

The four ⌞ 's that you find elsewhere on this page are the corners of a rectangle.

14. Use a ruler to help you find the area of this rectangle.

Solve.

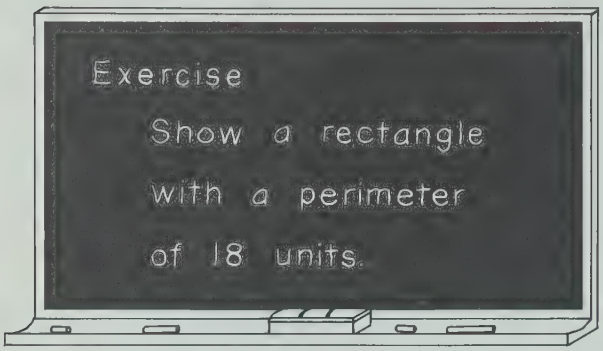
15. Mr. Soo plans to paint a wall. The wall, in the shape of a rectangle, is 3 m high and 4 m wide. How many square metres are to be painted?

16. A square picture hanging on a wall is 25 cm on each side. How much of the wall is covered?

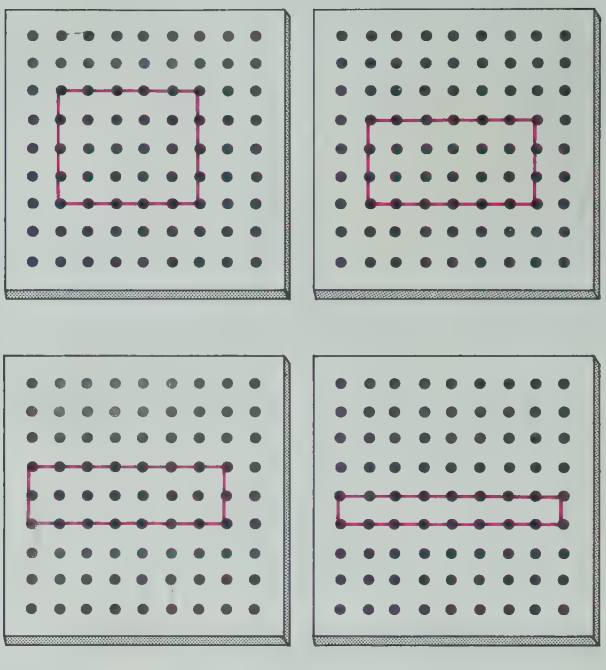
17. Charlene fenced in some land in the shape of a rectangle. It was 6 m long and 5 m wide. How much land did she fence? How much fencing did she need?

***18.** The piece of metal used for a pipe was in the shape of a rectangle 2 m long and 30 cm wide. What was its area?

Rectangles Having a Given Perimeter



The students used geoboards.



Exercises

Use a geoboard, dot paper, or graph paper. Show two rectangles each having a perimeter of

1. 8 units. **2.** 12 units.

3. 24 units. **4.** 16 units.

What is the area of each rectangle you made with a perimeter of

5. 8 units? **6.** 12 units? **7.** 24 units? **8.** 16 units?

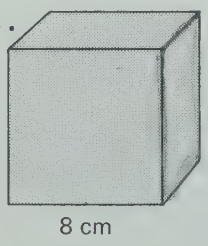
Solve.

9. What is the area of a square that has a perimeter of 20 cm?

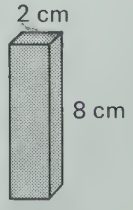
***10.** One side of a rectangle is twice the length of another side. The perimeter of the rectangle is 36 cm. What is the area of the rectangle?

Find the total length of all the edges for each of these eight shapes.

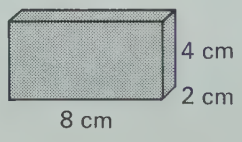
1.



2.



3.



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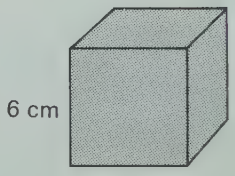


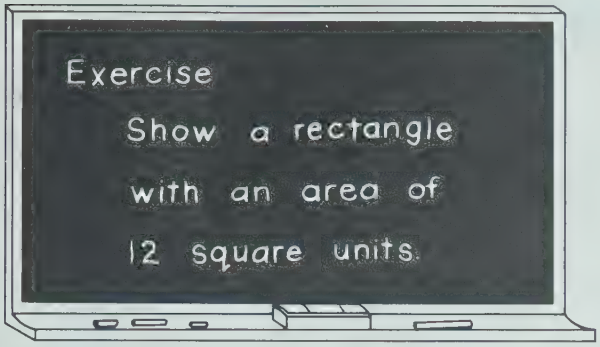
all squares

squares on top and bottom

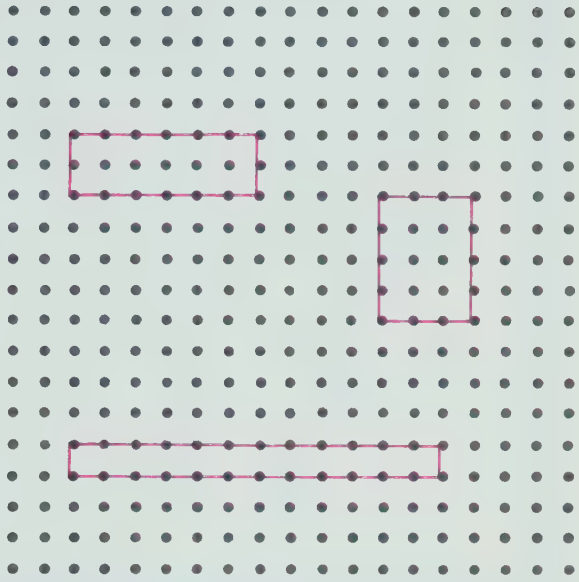
all rectangles, no squares

four square sides

Rectangles Having a Given Area



The students used dot paper.



Exercises

Use centimetre dot paper or graph paper. Show two rectangles each having an area of

1. 4 cm^2.
2. 16 cm^2.
3. 24 cm^2.
4. 30 cm^2.

What is the perimeter of each rectangle you made with an area of

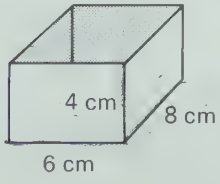
5. 4 cm^2?
6. 16 cm^2?
7. 24 cm^2?
8. 30 cm^2?

Solve.

9. What is the perimeter of a square that has an area of 36 cm^2?

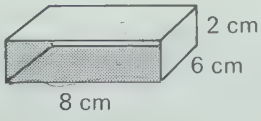
***10.** One side of a rectangle is 8 cm longer than another side. Its area is 48 cm^2. What is the perimeter of the rectangle?

5.



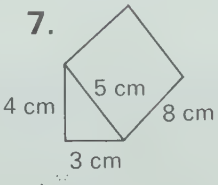
open at the top

6.



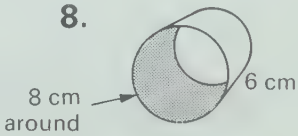
open at front and back

7.



half of a rectangle on each end

8.

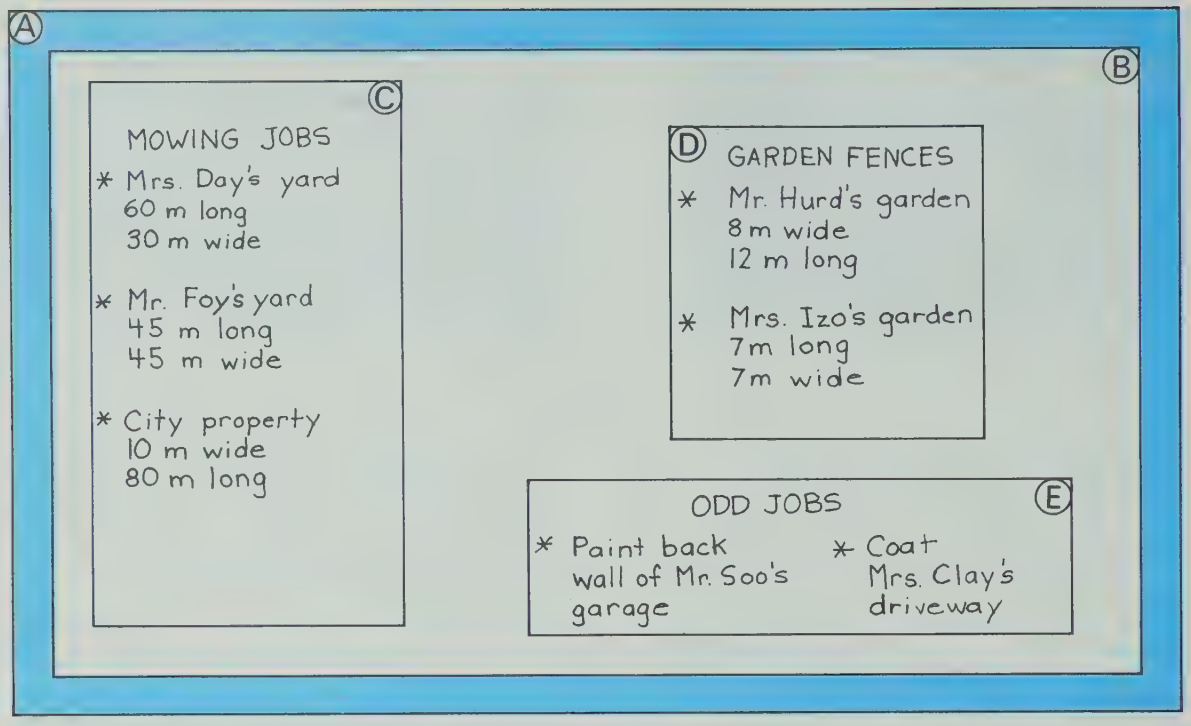


open at front and back

Find the number of square centimetres on the outside of each of these eight shapes.

PROBLEM SOLVING

Practice



Use the job board above.

1. Mr. Hurd's garden has the shape of a rectangle. How much fencing is needed for the four sides?

2. Mrs. Izo's garden has the shape of a square. How much fencing is needed for the four sides?

3. Mrs. Clay's driveway has the shape of a rectangle 6 m wide and 18 m long. It costs $4.25 to coat each square metre. How much will the job cost?

4. Each lawn to be mowed has the shape of a rectangle. Which mowing job would you choose? Why?

5. There are five rectangles in the picture above. Measure with a centimetre ruler to find the perimeter and the area of each.

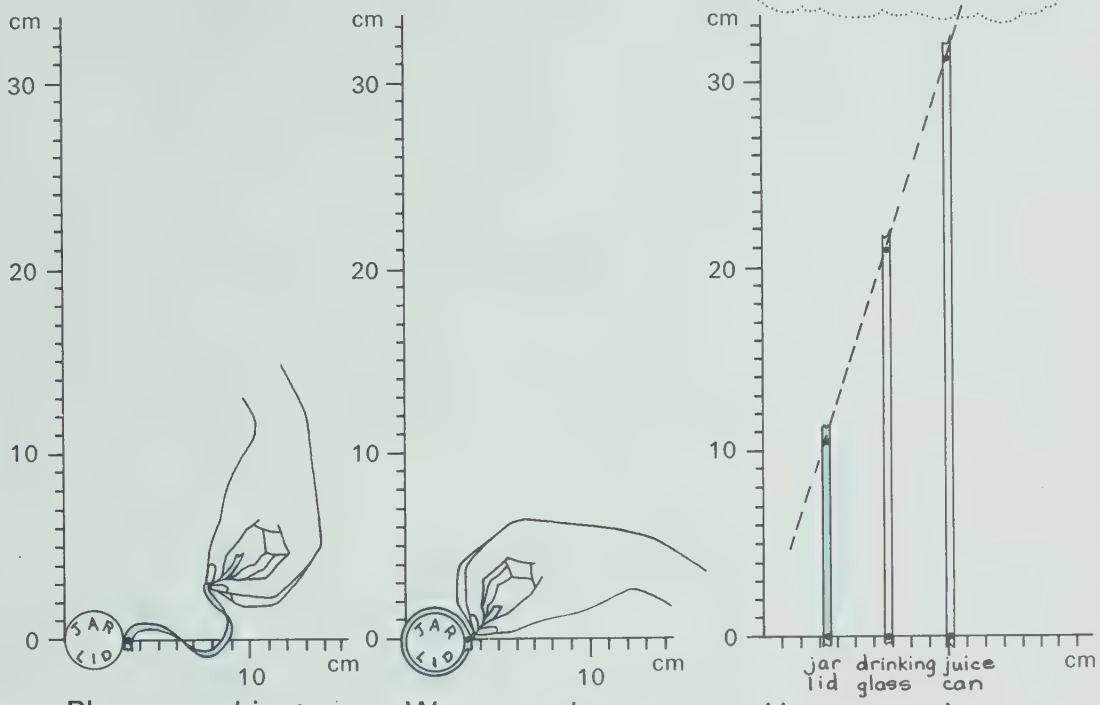
Complete.

	6.	7.	8.	9.	*10.	*11.	*12.
Length	16 m	35 cm	50 cm	25 m	9 cm	?	?
Width	13 m	27 cm	48 cm	25 m	?	2 m	?
Perimeter	?	?	?	?	34 cm	?	34 cm
Area	?	?	?	?	?	60 m^2	60 cm^2

Working with a Model

Tacks and string can be used to make a chart that shows distances around round objects.

"Distance around" is also called **circumference**.



Place an object and mark its diameter.

Wrap a string around for the circumference.

Unwrap and tack up the string.

1. Make a chart like those above using objects that suggest large circles.

pots, pans, wastebasket, wheels, plates, clock, bottles

2. Make a chart like those above using objects that suggest small circles.

coins, thumbtacks, rings, cans, lids and caps, toy wheels, buttons

3. How could you use one of your charts to find the circumference of a soap bubble?

4. How could you use one of your charts to find the circumference of the hole in a doughnut?

5. How could you use one of your charts to find the diameter of the circle you could make with a string 50 cm long?

PROBLEM SOLVING

Checking Up

Measure to the nearest centimetre.

1. _____
2. _____

Measure to the nearest millimetre.

3. ___
4. _____

Give each length in centimetres.

5. 2.35 m **6.** 15 mm

Give each length in millimetres.

7. 5.7 cm
8. 3 m

Give each length in metres.

9. 150 cm
10. 475 mm

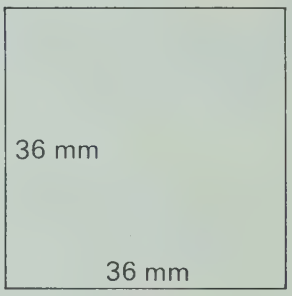
Complete.

	mm	cm	m
11.	3000	?	?
12.	?	25	?
13.	?	?	1.67

Find the perimeter.

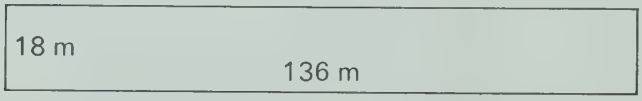
14.

15.

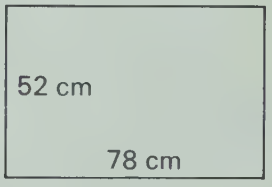


Find the area.

16.

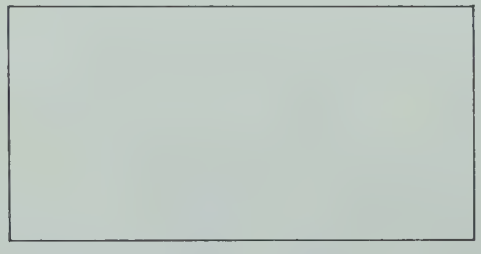


17.



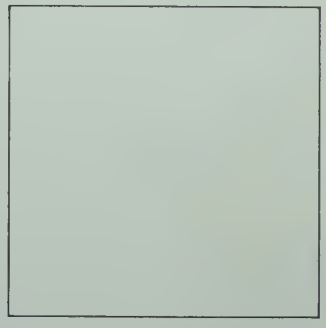
Measure to find the perimeter.

18.



Measure to find the area.

19.



Draw a rectangle

20. with a perimeter of 28 cm.

21. with an area of 36 cm^2.

Checking Skills

Multiply.

1. 50 30	**2.** 600 80	**3.** 30 20	**4.** 200 70	**5.** 700 10
6. 400 90	**7.** 50 40	**8.** 800 700	**9.** 300 300	**10.** 600 500

Tell how many digits there will be in each product. Then multiply.

11. 23 42	**12.** 506 73	**13.** 84 68	**14.** 799 19	**15.** 265 56

Multiply.

16. 34 3	**17.** 685 5	**18.** 1459 4	**19.** 46 36	**20.** 74 72
21. 703 40	**22.** 355 21	**23.** 2874 64	**24.** 2890 27	**25.** 523 956
26. \$3276 158	**27.** \$4.09 9	**28.** \$5.97 85	**29.** \$37.46 7	**30.** \$93.85 36

31. 5×1354 **32.** 49×637 **33.** 516×419

34. $79 \times \$67$ **35.** $3 \times \$7.29$ **36.** $827 \times \$40.88$

Solve.

37. Jenny bought 3 packages of stamps with 275 stamps in each package. How many stamps did she buy?

38. The airplane flies 1536 km each trip. How far does it fly in 9 trips?

39. 48 boxes of chalk were ordered for the school. Each box has 144 sticks. How many sticks of chalk would there be?

40. 175 persons each brought 12 cookies to the Cookie Sale. How many cookies were there for the Cookie Sale?

41. Each of 54 people paid \$375 for a one-week bus tour. How much did they pay in all?

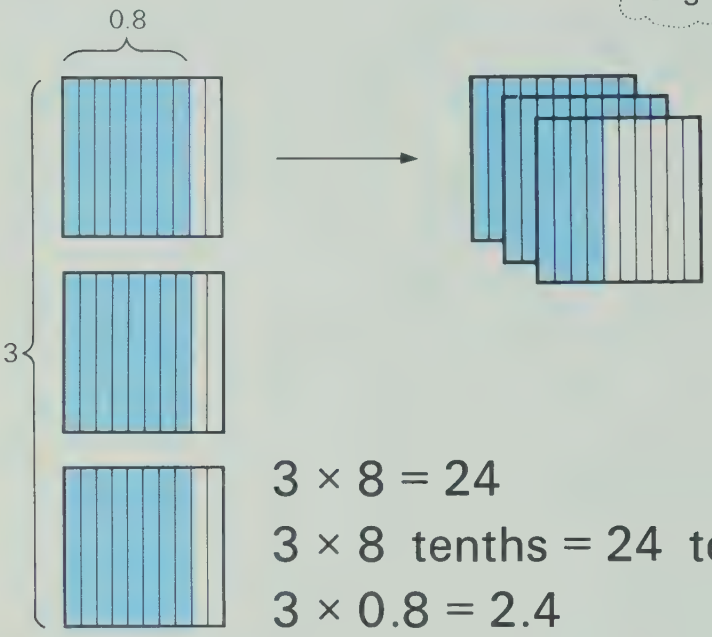
42. Each folding chair for the school cost \$11.45. How much did 325 folding chairs cost?

8 MULTIPLYING DECIMALS

Multiplying Decimals, to 0.9, 0.09, or 0.009, by One-Digit Whole Numbers

Multiply 3 and 0.8.

For 3×0.8, think of 3 groups of 8 tenths.



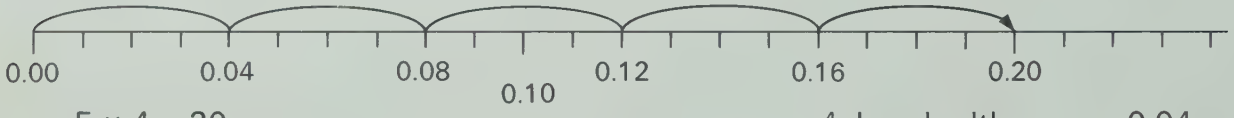
$3 \times 8 = 24$

3×8 tenths $= 24$ tenths

$3 \times 0.8 = 2.4$

8 tenths	0.8
3	3
24 tenths	2.4

Multiply 5 and 0.04.

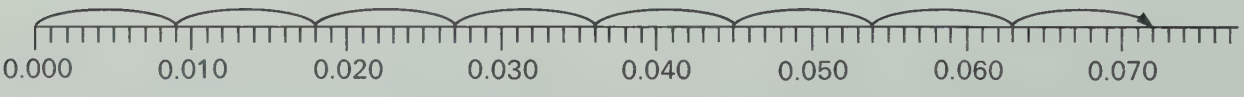


$5 \times 4 = 20$

5×4 hundredths $= 20$ hundredths

$5 \times 0.04 = 0.20$

4 hundredths	0.04
5	5
20 hundredths	0.20



Multiply 8 and 0.009.

$8 \times 9 = 72$

8×9 thousandths $= 72$ thousandths

$8 \times 0.009 = 0.072$

9 thousandths	0.009
8	8
72 thousandths	0.072

Working Together

Complete each multiplication.

1.
$4 \times 7 =$ ▒
4×7 tenths = ▒ tenths
$4 \times 0.7 =$ ▒

2.
$5 \times 3 =$ ▒
5×3 hundredths = ▒ hundredths
$5 \times 0.03 =$ ▒

3.
$7 \times 9 =$ ▒
7×9 thousandths = ▒ thousandths
$7 \times 0.009 =$ ▒

4. $2 \times 0.3 =$ ▒

5. $9 \times 0.06 =$ ▒

6.
$$\begin{array}{r} 0.5 \\ \times\ \ 6 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 0.09 \\ \times\ \ 8 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 0.002 \\ \times\ \ 7 \\ \hline \end{array}$$

Exercises

Multiply.

1. 4×0.2 **2.** 7×0.8 **3.** 4×0.09 **4.** 8×0.004 **5.** 7×0.05

6. 3×0.04 **7.** 6×0.1 **8.** 8×0.007 **9.** 9×0.3 **10.** 5×0.006

11.
$$\begin{array}{r} 0.5 \\ \times\ \ 2 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 0.07 \\ \times\ \ 5 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 0.003 \\ \times\ \ 6 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 0.8 \\ \times\ \ 9 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 0.01 \\ \times\ \ 3 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 0.9 \\ \times\ \ 9 \\ \hline \end{array}$$

Study the chart.

1. What do you think should go here?

kilometre	metre	millimetre
1000 m	1 m	0.001 m
?	litre	millilitre
?	1 L	0.001 L
kilogram	gram	?
1000 g	1 g	?

2. What do you think should go here?

3. What do you think will complete the pattern in the top row of this chart?

1000 m	100 m	?	1 m	0.1 m	?	0.001 m
kilometre	?	?	metre	decimetre	centimetre	millimetre

4. Find out the names that belong in the bottom row of the chart.

Make a chart like the one above

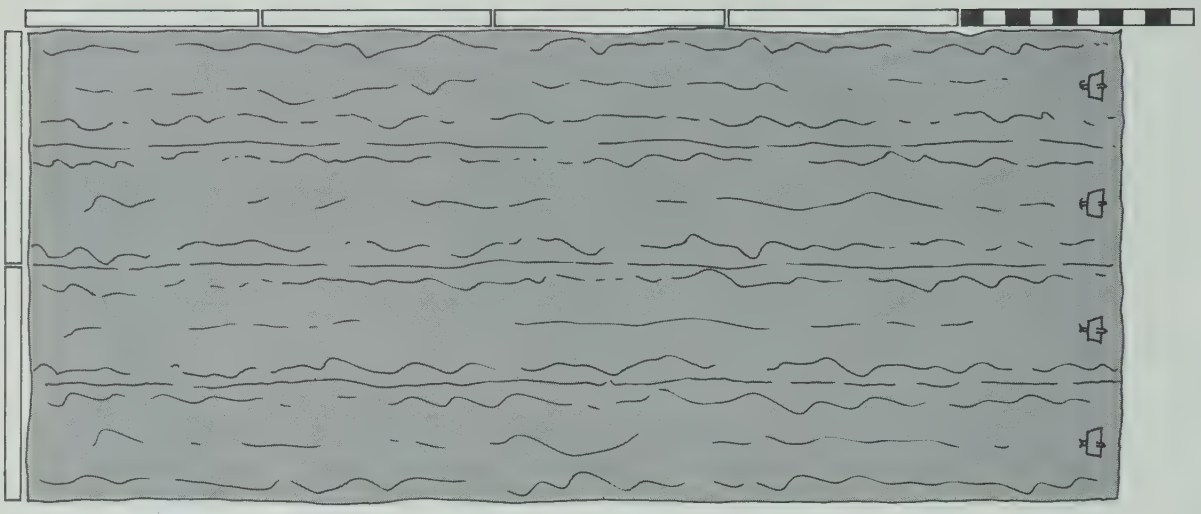
5. for the litre.

6. for the gram.

try this

Multiplying Decimals by One-Digit Whole Numbers

Wendy's flower garden is 4.7 m long and 2 m wide.
How many square metres are there in Wendy's garden?



To find the area of Wendy's garden in square metres, multiply 2 and 4.7.

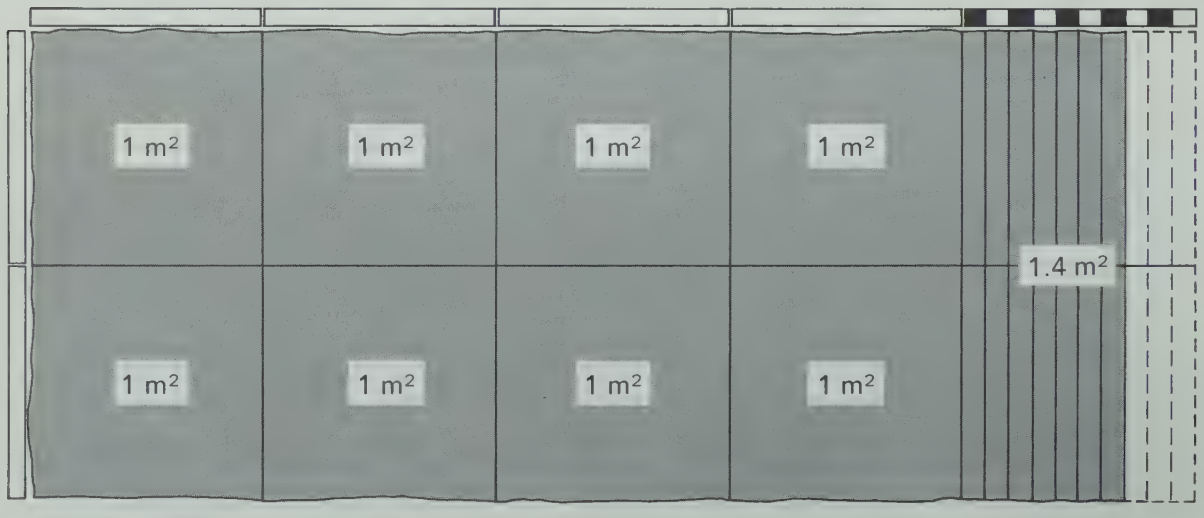
$$\begin{array}{r} {\scriptstyle 1} \\ 4.7 \\ \times\ 2 \\ \hline 9.4 \end{array}$$

2 × 7 tenths = 14 tenths or 1 one and 4 tenths.

2 × 4 ones = 8 ones. Another one makes 9 ones.

Place the decimal point in the product.

There are 9.4 m^2 in Wendy's garden.



Working Together

Complete each multiplication.

1.

25	25 tenths	2.5
3	3	3
[illegible]	[illegible] tenths	7.5

2.

53	53 hundredths	0.53
4	4	4
[illegible]	[illegible] hundredths	[illegible]

3.

2375	2375 thousandths	2.375
7	7	7
[illegible]	[illegible] thousandths	[illegible]

4. 6.9 × 8

5. 0.28 × 3

6. 1.035 × 6

Exercises

Multiply.

1. 2.5 × 9

2. 0.19 × 4

3. 0.006 × 3

4. 72.8 × 8

5. 0.708 × 6

6. 4.63 × 9

7. 0.4 × 8

8. 9.42 × 7

9. 0.07 × 9

10. 8.4 × 5

11. 63.95 × 6

12. 7.04 × 7

13. 5 × 0.179

14. 4 × 7.628

15. 2 × 0.096

16. 3 × 3.79

17. 2 × 5.8

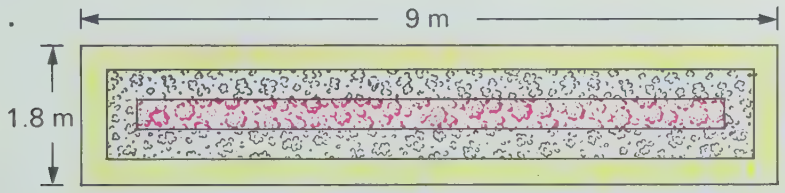
18. 7 × 0.68

19. 5 × 2.065

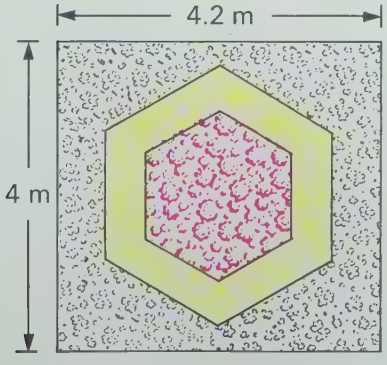
20. 6 × 1.824

How many square metres are in each of these flower gardens?

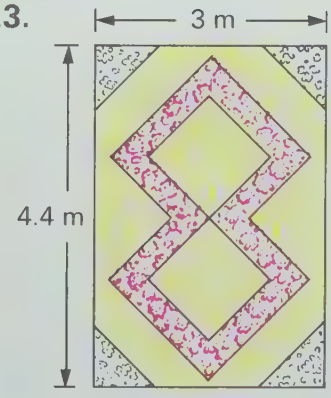
21.



22.



23.



Estimating the Product

An estimate can help you remember where to place the decimal point in a product.

To estimate the product of 7 and 8.9,

round $8.9 \longrightarrow 9$

then multiply. $\begin{array}{r} 9 \\ \times\ 7 \\ \hline 63 \end{array}$

For the exact product, multiply in the usual way.

$$\begin{array}{r} 8.9 \\ \times\ 7 \\ \hline 62.3 \end{array}$$

The estimate tells you that the product is about 63. A decimal point is needed here.

Working Together

Round to the nearest whole number.

1. 5.8 **2.** 7.49

3. 0.64 **4.** 3.057

Round to the nearest whole number and multiply to estimate the product. Then find the exact product.

5. 3.9 $\times$ 7

6. 6.094 $\times$ 4

7. 12.74 $\times$ 6

Exercises

Round to the nearest whole number and multiply to estimate the product. Then find the exact product.

1. 5.8 $\times$ 2

2. 6.93 $\times$ 5

3. 8.485 $\times$ 7

4. 6.8 $\times$ 6

5. 5.07 $\times$ 4

6. 4.644 $\times$ 8

7. 3.4 $\times$ 9

8. 6.37 $\times$ 5

9. 38.75 $\times$ 3

10. 4×7.19

11. 2×3.5

12. 8×9.2

13. 5×9.708

14. 3×5.098

15. 6×31.5

16. 9×9.91

17. 7×8.62

Use the information shown in the picture on the next page to help you complete this chart.

		Estimated cost	Exact cost
18.	5 bags of grass seed	?	?
19.	8 bags of plant food	?	?
20.	6 cans of plant spray	?	?
21.	7 juniper bushes	?	?
22.	4 pear trees	?	?

Practice

Round to the nearest whole dollar and multiply to estimate the cost. Then find the exact cost.

1. How much will 6 boxes of marigolds cost?

2. How much will 4 Northern Spy apple trees cost?

3. How much will 9 potted begonias cost?

4. How much will 7 pots of mums cost?

5. Garden gloves sell for $2.75 a pair. How much will 3 pairs cost?

***6.** How much is saved when 3 pairs of garden gloves are bought at a sale price of $1.98?

7. $4.95 × 2

8. $3.64 × 8

9. $3.12 × 5

10. $8.72 × 6

11. $12.09 × 4

12. $11.89 × 3

13. 8 × $3.95

14. 9 × $2.48

15. 8 × $9.89

16. 7 × $7.50

17. 3 × 35¢

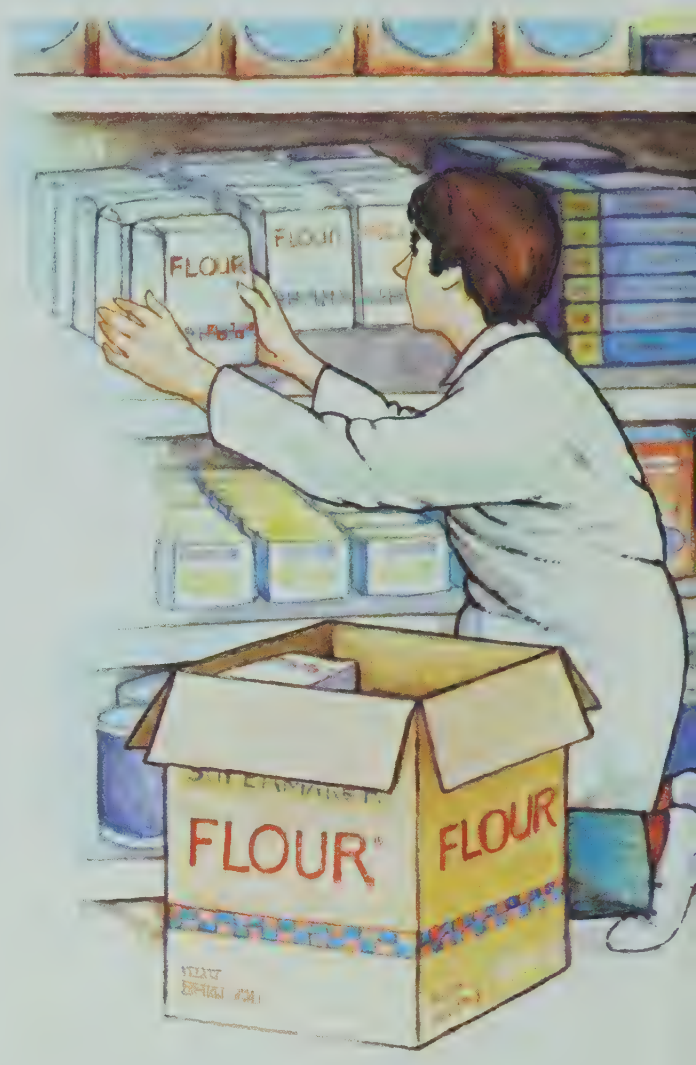
18. 8 × 75¢

19. 7 × 79¢

20. 5 × 98¢

Multiplying Decimals and Whole Numbers

The shelf can hold 200 kg safely. The clerk has 75 bags of flour. Each bag holds 2.5 kg. Can the shelf hold all the bags safely?



Multiply 75 and 2.5.

For the product

$$\begin{array}{r} 2.5 \\ \times\ 75 \\ \hline \end{array}$$

you need to know how to multiply 5 and 25,

$$\begin{array}{r} {\scriptstyle 2} \\ 2.5 \\ \times\ 75 \\ \hline 12\,5 \end{array}$$

The decimal point would be here, but there is no need to show it yet.

and how to multiply 7 and 25.

$$\begin{array}{r} {\scriptstyle 3} \\ 2.5 \\ \times\ 75 \\ \hline 12\,5 \\ 175\,0 \end{array}$$

The decimal point would be here, but there is no need to show it yet.

Then add and place the decimal point.

$$\begin{array}{r} 2.5 \\ \times\ 75 \\ \hline 12\,5 \\ 175\,0 \\ \hline 187.5 \end{array}$$

There are 187.5 kg of flour in all.
The shelf can hold all the bags safely.

You can change the order of the factors to check your work.

$$\begin{array}{r} 75 \\ \times\ 2.5 \\ \hline 37\,5 \\ 150\,0 \\ \hline 187.5 \end{array}$$

If this result does not match the first result, there is a mistake in your work.

Working Together

Complete each multiplication.

1.

32	32 tenths	3.2
27	27	27
[redacted]	[redacted] tenths	[redacted]

2.

143	143	143
18	18 tenths	1.8
[redacted]	[redacted] tenths	[redacted]

3.

264	2.64
76	76

4.

718	0.718
36	36

5.

375	375
239	2.39

Multiply. Change the order of the factors, then multiply again to check your work.

6. $\begin{array}{r} 5.9 \\ \times\ 27 \end{array}$ **7.** $\begin{array}{r} 324 \\ \times\ 1.76 \end{array}$ **8.** 4.7×68

9. 94×3.25

Is this good thinking?

1. If Sue can run 1 km in 5 min, she can run 10 km in 50 min.
2. If each bottle holds 1.5 L, then 100 of these bottles hold 150 L.
3. If 7 mm of rain fall in 1 h, then 70 mm will fall in 10 h.
4. If 1 L of gasoline costs 22.9¢, 100 L will cost $22.90.
5. If the mass of 1 girl is 43 kg, the mass of 10 girls is 430 kg.
6. If 52 players are on 10 teams, each team has 5.2 players.

PROBLEM SOLVING

Exercises

Multiply. Change the order of the factors, then multiply again to check your work.

1. $\begin{array}{r} 47 \\ \times\ 5.9 \end{array}$ **2.** $\begin{array}{r} 3.69 \\ \times\ 16 \end{array}$ **3.** $\begin{array}{r} 388 \\ \times\ 5.21 \end{array}$ **4.** $\begin{array}{r} 4.688 \\ \times\ 64 \end{array}$

5. 264×0.7 **6.** 0.25×39

7. 74.4×76 **8.** 188×0.073

Rounding can help you estimate products.

Example:

For the product of 38 and 2.13,

round 2.13 → 40
round 38 → 2
then multiply. → 80

Multiply for the exact product.

$\begin{array}{r} 2.13 \\ \times\ 38 \\ \hline 80.94 \end{array}$

Round and multiply to estimate the product. Then find the exact product.

9. $\begin{array}{r} 92 \\ \times\ 7.7 \end{array}$ **10.** $\begin{array}{r} 5.51 \\ \times\ 74 \end{array}$ **11.** $\begin{array}{r} 538 \\ \times\ 2.63 \end{array}$ **12.** $\begin{array}{r} 38.9 \\ \times\ 21 \end{array}$

Practice

Multiply. Change the order of the factors, then multiply again to check your work.

1. $\begin{array}{r} 58 \\ \times\ 2.9 \end{array}$ **2.** $\begin{array}{r} 84.6 \\ \times\ 138 \end{array}$ **3.** $\begin{array}{r} 2.58 \\ \times\ 89 \end{array}$ **4.** $\begin{array}{r} 367 \\ \times\ 9.12 \end{array}$ **5.** $\begin{array}{r} 43.25 \\ \times\ 29 \end{array}$ **6.** $\begin{array}{r} 293 \\ \times\ 3.4 \end{array}$

7. 35×19.6 **8.** 126×15.88 **9.** 72×7.538 **10.** 251×4.177

11. $14 \times \$5.49$ **12.** $\$2.31 \times 66$ **13.** $218 \times \$7.34$ **14.** $\$19.76 \times 47$

Round and multiply to estimate the product. Then find the exact product.

15. $\begin{array}{r} 2.3 \\ \times\ 6 \end{array}$ **16.** $\begin{array}{r} 39.2 \\ \times\ 24 \end{array}$ **17.** $\begin{array}{r} 849 \\ \times\ 1.3 \end{array}$ **18.** $\begin{array}{r} 4.287 \\ \times\ 9 \end{array}$ **19.** $\begin{array}{r} 3.429 \\ \times\ 71 \end{array}$ **20.** $\begin{array}{r} 252 \\ \times\ 24.3 \end{array}$

21. 8×75.93 **22.** 384×16.28 **23.** 7×19.7 **24.** 46×9.8

25. $5 \times \$1.93$ **26.** $64 \times \$5.61$ **27.** $\$7.17 \times 283$ **28.** $37 \times \$43.48$

The "number lines" shown on radios help listeners find the stations they want.

Stations with names ending in FM are found along here.

The other stations are found along here.

Copy both "radio number lines" along the edges of a piece of paper. Mark your copies to show where to find these stations.

1. CFUN, Vancouver	1410	**2.** CFCN, Calgary	1060
3. CFMQ-FM, Regina	92.1	**4.** CKY, Winnipeg	580
5. CHUM-FM, Toronto	104.5	**6.** CINQ-FM, Montreal	99.3
		7. CKCW, Moncton	1220
		8. CHTN, Charlottetown	1190
		9. CHFX-FM, Halifax	96.1
		10. CJON, St. John's	930
		11. CFYK, Yellowknife	1340

try this

Laura's grandfather retired after 50 years with the company.

29. Complete this chart that shows how much he earned at different times in the 50 years.

	1st year	5th year	10th year	20th year	30th year	40th year	50th year
Amount earned each hour	$0.45	$0.76	$1.41	$3.18	$5.23	$7.37	$9.82
Hours worked in a day	11	10	10	9	8	8	8
Amount earned in a day	?	?	?	?	?	?	?
Days worked in a week	6	6	6	6	5	5	4
Amount earned in a week	?	?	?	?	?	?	?
Amount earned in 52 weeks	?	?	?	?	?	?	?

30. Draw a graph using the information from one of the rows you completed in the chart above.

Round the amounts of money before you draw the graph.

*__31.__ Find the information you need. Then complete a chart like this for jobs in your community.

Job	Amount earned each hour	Hours worked in a day	Days worked in a week	Amount earned in a week
TV Repair	$6.28	8	5	$251.20
Sitter	$1.20			

1000, 100, 10, 1, 0.1, 0.01, or 0.001 as a Factor

When you multiply a number and 10, 100, or 1000, the digits move to places with greater values in a place-value chart.

When you multiply a number and 0.1, 0.01, or 0.001, the digits move to places with lesser values in a place-value chart.

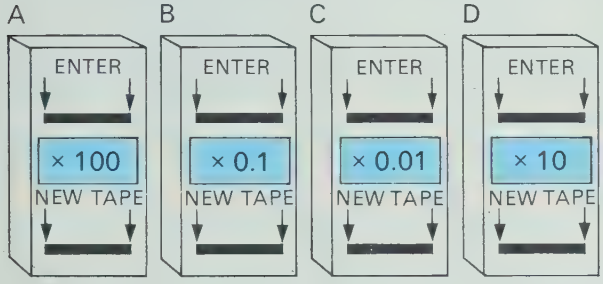
| tens | ones | | |

Exercises

Multiply.

1. 10 × 42	**2.** 0.01 × 520
3. 8 × 0.1	**4.** 27.64 × 100
5. 1000 × 1.82	**6.** 2.6 × 0.01
7. 100 × 0.008	**8.** 0.1 × 0.04
9. 0.001 × 6500	**10.** 0.63 × 10
11. 0.075 × 1000	**12.** 0.001 × 48
13. 0.1 × 7.6	**14.** 10 × 0.76
15. 0.03 × 100	**16.** 3 × 0.01

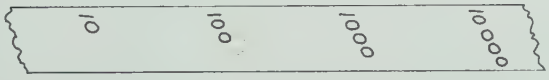
These machines change the numbers on each tape entered according to the rules shown.



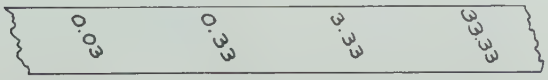
What will the new tape show when the tape below is entered into

17. machine A? **18.** machine B?

19. machine C? **20.** machine D?



*21. machine B and the tape from B then entered into machine A?



*22. What results when a tape is entered into machine D and then its new tape entered into machine B?

The names for different units of length all use "metre".

1 km (**kilo**metre)	= 1000 m
1 hm (**hecto**metre)	= 100 m
1 dam (**deca**metre)	= 10 m
1 m (metre)	= 1 m
1 dm (**deci**metre)	= 0.1 m
1 cm (**centi**metre)	= 0.01 m
1 mm (**milli**metre)	= 0.001 m

The names for different units of mass all use "gram" in the same way.

1. Make a chart, like the one above, for the units of mass.

The chart would begin like this:

1 kg (kilogram)	= 1000 g
1 [illegible] (gram)	= 100 g

The names for different units of capacity all use "litre" in the same way.

2. Make a chart, like the ones above, for units of capacity.

3. Complete three charts like this, one for length, one for mass, and one for capacity.

1 m = ? mm
1 m = ? cm
1 m = ? dm
1 m = 1 m
1 m = ? dam
1 m = ? hm
1 m = ? km

try this

Changing Measurement Units

Knowing how to multiply by 10, 100, 1000, 0.1, 0.01, or 0.001 can help you change from one measurement unit to another.

1 m = 10 dm	1 dm = 0.1 m
1 m = 100 cm	1 cm = 0.01 m
1 m = 1000 mm	1 mm = 0.001 m

How many centimetres are there in 3.28 m?

1 m = 100 cm
3.28 m = 3.28 × 100 cm
3.28 m = 328 cm

How many metres are there in 25 000 mm?

1 mm = 0.001 m
25 000 mm = 25 000 × 0.001 m
25 000 mm = 25 m

Exercises

Complete.

1. 1 m = ▒ mm
4.67 m = 4.67 × ▒ mm
4.67 m = ▒ mm

2. 1 cm = ▒ m
62.5 cm = 62.5 × ▒ m
62.5 cm = ▒ m

3. 16 000 mm = ▒ m

4. 3.33 m = ▒ cm

5. 7 m = ▒ mm

6. 2.75 cm = ▒ mm

7. 450 cm = ▒ m

8. 280 mm = ▒ cm

9. 2.875 m = ▒ dm

10. 3.4 dm = ▒ m

11. 6.3 dm = ▒ cm

Change each to millimetres.

12. 0.3 cm

13. 1.28 m

14. 75 cm

15. 0.33 m

Change each to centimetres.

16. 0.7 m

17. 7500 mm

18. 12.8 m

19. 50 mm

Change each to metres.

20. 3500 mm

21. 26 cm

22. 4 mm

23. 1250 cm

Use these facts to help you change

\$1 = 100¢	1¢ = \$0.01

24. 185¢ to dollars.

25. \$0.63 to cents.

26. 250¢ to dollars.

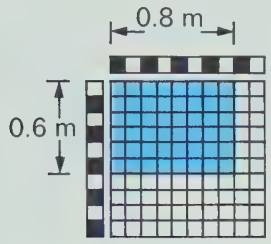
27. \$10.80 to cents.

28. 4¢ to dollars.

29. \$0.30 to cents.

Multiplying Decimal Tenths, Both Factors Less Than 1.0

The product of two decimals showing tenths is a decimal showing hundredths.

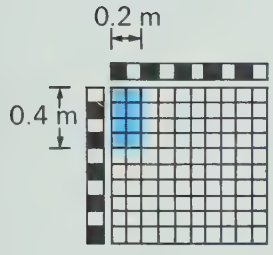


$6 \times 8 = 48$

6 tenths × 8 tenths = 48 hundredths

$0.6 \times 0.8 = 0.48$

A rectangle 0.6 m wide and 0.8 m long covers 0.48 m^2.



$4 \times 2 = 8$

4 tenths × 2 tenths = 8 hundredths

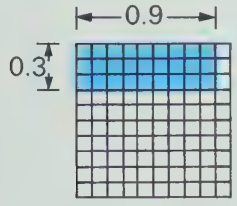
$0.4 \times 0.2 = 0.08$

A rectangle 0.4 m long and 0.2 m wide covers 0.08 m^2.

Working Together

Write a multiplication sentence to match this picture.

1.



Complete each multiplication. Remember, the product of two decimals showing tenths is a decimal showing hundredths.

2. $3 \times 5 =$ ▢

3 tenths × 5 tenths = ▢ hundredths

$0.3 \times 0.5 =$ ▢

3.

7	7 tenths	0.7
8	8 tenths	0.8
▢	▢ hundredths	▢

4. 0.6 × 0.9

5. 0.4 × 0.7

Exercises

Multiply.

1. 0.3 × 0.2

2. 0.2 × 0.7

3. 0.9 × 0.5

4. 0.3 × 0.3

5. 0.8 × 0.5

6. 0.4 × 0.9

7. 0.6 × 0.4

8. 0.7 × 0.7

9. 0.9 × 0.8

10. 0.1 × 0.7

11. 0.2 × 0.8

12. 0.8 × 0.6

13. 0.6 × 0.5

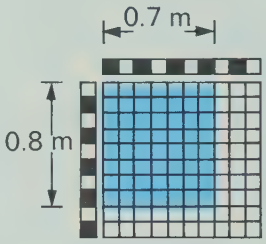
14. 0.4 × 0.6

Multiplying Decimal Tenths, One Factor Less Than 1.0

What is the area of a rectangle that is 3.7 m long and 0.8 m wide?

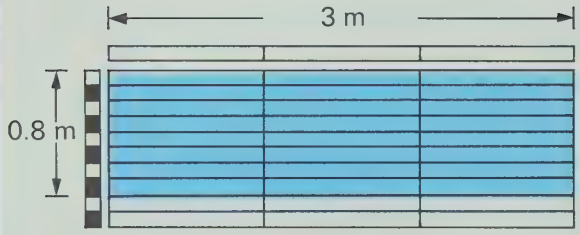
Multiply 0.8 and 3.7.

The product of 0.8 and 0.7 is 0.56.



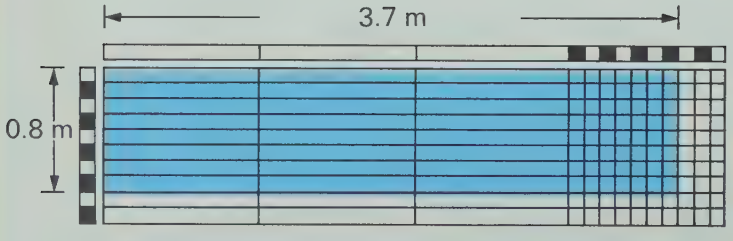
$0.8 \times 0.7 = 0.56$

The product of 0.8 and 3 is 2.4.



$0.8 \times 3 = 2.4$

The product of 0.8 and 3.7 is 2.96.



$0.8 \times 3.7 = 2.96$

The area of the rectangle is 2.96 m^2.

Take another look:

For the product,

$$\begin{array}{r} 3.7 \\ \times\ 0.8 \\ \hline \end{array}$$

Use $0.8 \times 0.7 = 0.56$

$$\begin{array}{r} {\scriptstyle 5} \\ 3.7 \\ \times\ 0.8 \\ \hline 6 \end{array}$$

No decimal point is shown in the product yet.

Then, use $0.8 \times 3 = 2.4$

$$\begin{array}{r} {\scriptstyle 5} \\ 3.7 \\ \times\ 0.8 \\ \hline 2.96 \end{array}$$

2 and 4 tenths and 5 tenths more make 2 and 9 tenths.

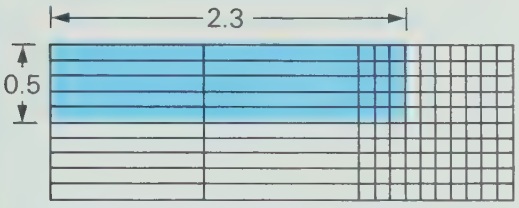
Multiplying $\begin{array}{r} 3.7 \\ \times\ 0.8 \end{array}$

is like multiplying $\begin{array}{r} 37 \\ \times\ 8 \end{array}$

but you have to put a decimal point in the product when you finish.

Working Together

Write a multiplication sentence to match this picture.



Complete each multiplication. Remember, the product of two decimals showing tenths is a decimal showing hundredths.

1.

38	38 tenths	3.8
4	4 tenths	0.4
	hundredths	

2.

152	15.2
6	0.6

3. $\begin{array}{r} 5.7 \\ \times\ 0.3 \end{array}$ **4.** $\begin{array}{r} 26.3 \\ \times\ 0.7 \end{array}$ **5.** 0.5×7.9 **6.** 0.8×36.5

Exercises

Multiply.

1. $\begin{array}{r} 4.6 \\ \times\ 0.3 \end{array}$ **2.** $\begin{array}{r} 3.5 \\ \times\ 0.8 \end{array}$ **3.** $\begin{array}{r} 1.8 \\ \times\ 0.9 \end{array}$ **4.** $\begin{array}{r} 2.3 \\ \times\ 0.4 \end{array}$

5. $\begin{array}{r} 17.4 \\ \times\ 0.2 \end{array}$ **6.** $\begin{array}{r} 45.6 \\ \times\ 0.5 \end{array}$ **7.** $\begin{array}{r} 83.9 \\ \times\ 0.3 \end{array}$ **8.** $\begin{array}{r} 27.8 \\ \times\ 0.4 \end{array}$

9. 0.6×5.3 **10.** 0.2×6.6

11. 0.5×4.7 **12.** 0.8×7.2

13. 0.9×61.5 **14.** 0.7×38.9

What is the area of a rectangle that is

15. 0.4 m wide and 6.6 m long?

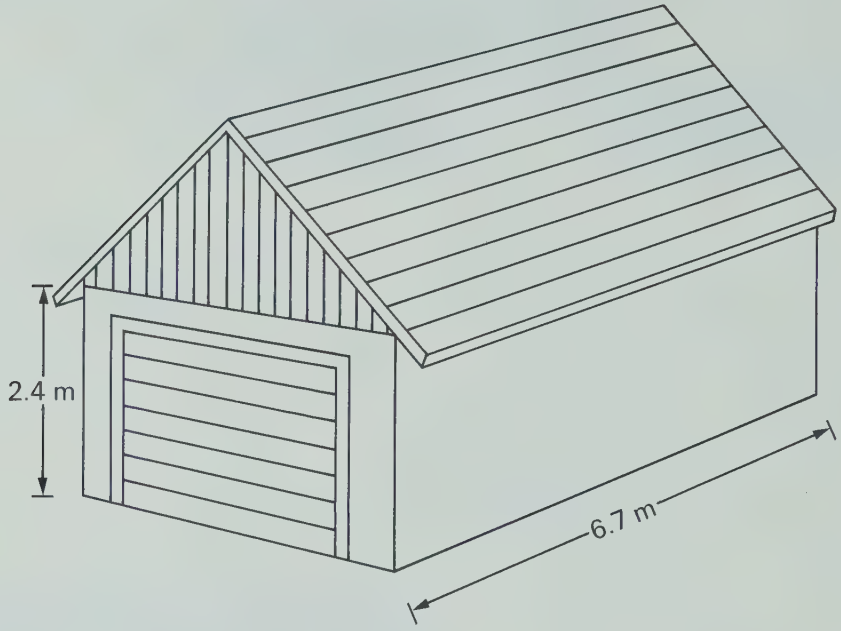
16. 1.8 m long and 0.7 m wide?

17. 0.6 m wide and 7.6 m long?

18. 11.9 m long and 0.9 m wide?

Multiplying Decimal Tenths

The paint can says that there is enough paint inside to cover 15 m^2. The side of the garage is 6.7 m long and 2.4 m high. Is there enough paint to cover the side of the garage?



Multiply 2.4 and 6.7.

For the product

$$\begin{array}{r} 6.7 \\ \times\ 2.4 \\ \hline \end{array}$$

and how to multiply 2 and 67.

$$\begin{array}{r} {\scriptstyle 1} \\ 6.7 \\ \times\ 2.4 \\ \hline 268 \\ 1340 \end{array}$$

The decimal point would be here, but there is no need to show it yet.

you need to know how to multiply 4 and 67,

$$\begin{array}{r} {\scriptstyle 2} \\ 6.7 \\ \times\ 2.4 \\ \hline 268 \end{array}$$

The decimal point would be here, but there is no need to show it yet.

Then add and place the decimal point.

$$\begin{array}{r} 6.7 \\ \times\ 2.4 \\ \hline 268 \\ 1340 \\ \hline 16.08 \end{array}$$

The decimal point is here since the product of tenths and tenths is hundredths.

The side of the garage has an area of 16.08 m^2.
There is not enough paint for the side of the garage.

Working Together

Complete each multiplication. Remember, the product of two decimals showing tenths is a decimal showing hundredths.

1. 32 × 26 = 3.2 × 2.6

2. 157 × 34 = 15.7 × 34

3. 2.5 × 4.7

4. 36.4 × 15.9

Multiply. Then change the order of the factors to check your work.

5. 5.9 × 3.8 — Check using → 3.8 × 5.9

6. 6.8 × 2.3

7. 7.4×13.2

8. 29.5×34.6

Exercises

Multiply. Then change the order of the factors to check your work.

1. 4.8 × 2.3

2. 4.7 × 8.2

3. 3.7 × 5.5

4. 7.3 × 3.7

5. 6.6 × 8.3

6. 23.4 × 9.6

7. 689 × 2.5

8. 56.7 × 86.4

9. 82.5 × 142

10. 259.2 × 93.6

11. 2.9×9.5

12. 55.4×7.8

13. 4.8×25.9

14. 76.5×47.4

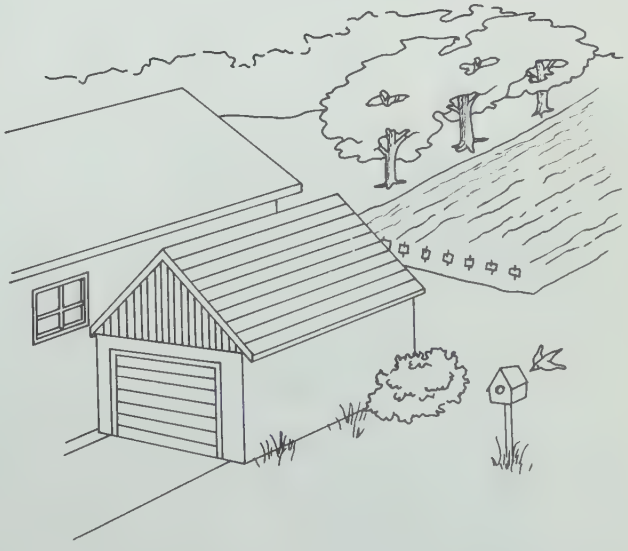
Solve.

15. How many square centimetres of glass are in a pane that is 16.5 cm wide and 23.5 cm long?

16. How many square centimetres are in all 4 panes of the window?

17. The 2 boards on the roof of the birdhouse are each 11.5 cm long and 9.5 cm wide. How many square centimetres of wood are in the roof of the birdhouse?

*__18.__ The rows in the garden are 0.5 m apart. How far apart are the first and fifth rows?



Practice

Rounding can help you estimate the product of two decimals.

Example:

For the product of 2.8 and 7.3,

round 2.8 ⟶ 3
round 7.3 ⟶ 7
then multiply ⟶ 21

Multiply for the exact product.

$$\begin{array}{r} 2.8 \\ \underline{7.3} \\ 84 \\ \underline{19\,60} \\ 20.44 \end{array}$$

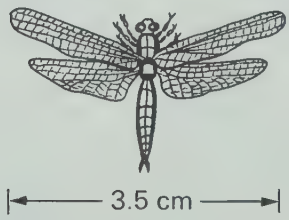
The estimate also helps you remember where to place the decimal point.

Round and multiply to estimate the product. Then find the exact product.

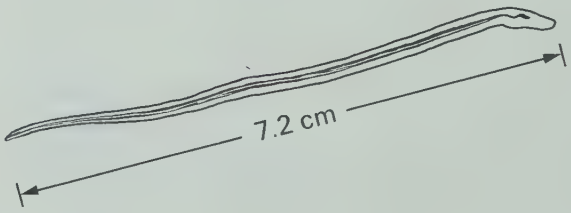
1. $\begin{array}{r} 8.1 \\ \underline{5.6} \end{array}$	**2.** $\begin{array}{r} 2.8 \\ \underline{6.3} \end{array}$	**3.** $\begin{array}{r} 9.2 \\ \underline{1.4} \end{array}$	**4.** $\begin{array}{r} 7.7 \\ \underline{4.9} \end{array}$	**5.** $\begin{array}{r} 3.5 \\ \underline{9.1} \end{array}$
6. $\begin{array}{r} 9.8 \\ \underline{5.3} \end{array}$	**7.** $\begin{array}{r} 71.4 \\ \underline{8.6} \end{array}$	**8.** $\begin{array}{r} 29.7 \\ \underline{6.2} \end{array}$	**9.** $\begin{array}{r} 44.9 \\ \underline{19.5} \end{array}$	**10.** $\begin{array}{r} 31.4 \\ \underline{28.6} \end{array}$

Multiply to answer the questions about these garden creatures.

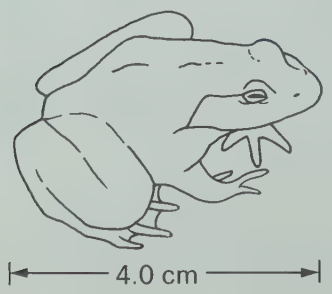
11. A dragonfly's wingspan can be 1.8 times as wide as this. How wide can it be?



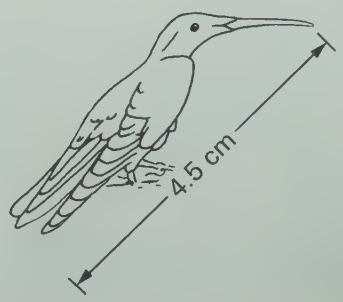
12. A garter snake can be 12.5 times as long as this. How long can it be?



13. A frog can be 1.9 times as long as this. How long can it be?



14. A hummingbird can be 2.2 times as long as this. How long can a hummingbird be?



The Floating Decimal Point

When a number is multiplied by 0.1,

	tens	ones	tenths	hundredths		tens	ones	tenths	hundredths
0.1 ×	2	8	6		=		2	8	6

each digit takes a value that is one place less.

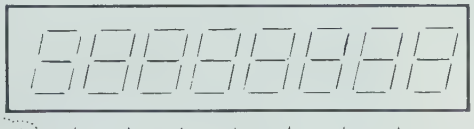
On a calculator,

0.1 × =

The decimal point "hops" one place to the left.

The digits stay in the same place in the display.

In many calculator displays, the decimal point can be in any of these positions.



sometimes even here

For a calculator with a floating decimal point, the value for each place in the display depends upon the position of the decimal point.

These calculators have a **floating decimal point**.

What will the display on a calculator with a floating decimal point show for each of these? What will be the place value of the 3 in the display?

1. 10 ⊠ 3 ⊟ ____

2. 0.01 ⊠ 3 ⊟ ____

3. 10 ⊠ 10 ⊠ 10 ⊠ 10 ⊠ 3 ⊟ ____

4. 0.1 ⊠ 0.1 ⊠ 0.1 ⊠ 3 ⊟ ____

5. 10 ⊠ 3 ⊠ 0.1 ⊟ ____

6. 0.01 ⊠ 3 ⊠ 10 ⊟ ____

7. 3000 ⊠ 0.1 ⊠ 0.1 ⊠ 0.1 ⊠ 0.1 ⊟ ____

8. 0.3 ⊠ 100 ⊠ 100 ⊠ 0.1 ⊠ 100 ⊟ ____

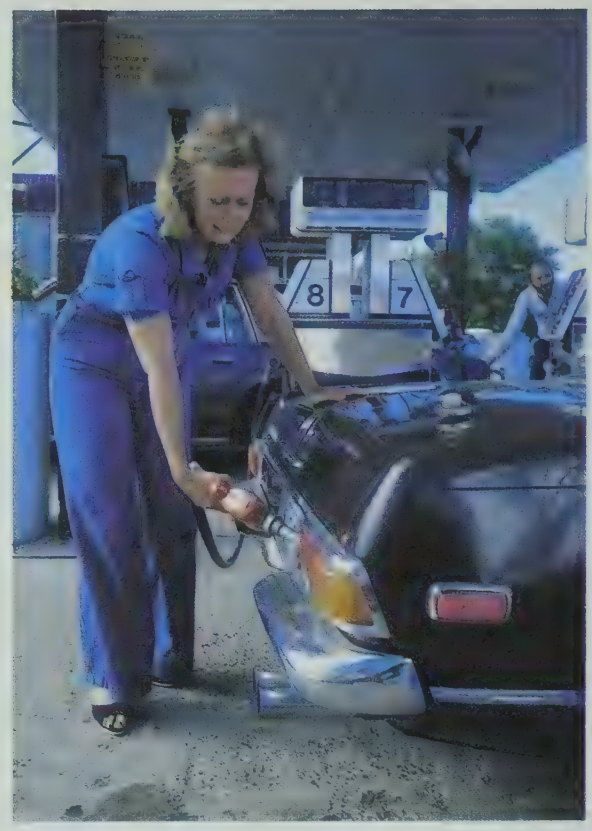
9. 0.01 ⊠ 3.5 ⊠ 1000 ⊠ 0.1 ⊠ 100 ⊠ 0.001 ⊟ ____

10. 0.1 ⊠ 3729 ⊠ 0.01 ⊠ 100 ⊠ 0.1 ⊠ 1000 ⊠ 0.1 ⊠ 0.001 ⊟ ____

Calculator

Writing Equations

Eva's mother told her their gasoline tank holds 40 L. They bought 22 L to fill the tank. How many litres of gasoline were there in the tank before the "fill-up"?



Eva wrote this equation.

$$n + 22 = 40$$

- n: number of litres in the tank
- 22: number of litres added
- 40: number of litres in a full tank

An equation is a number sentence that has an equals sign (=). Sometimes all the numbers are shown in the sentence. Sometimes another symbol, like the **n** in Eva's equation, is used for a number.

Write an equation for each of these. Use **n** to stand for the number that is not given.

1. The sum of two numbers is 231. One of the numbers is 187.
2. The product of two numbers is 371. One of the numbers is 7.
3. The difference of two lengths is 95.7 cm. The greater of the two lengths is 142.3 cm.
4. The difference of two amounts of money is \$4.67. The lesser amount is \$0.86.
5. The two numbers 23.7 and 162 are to be multiplied.
6. One of 2172 and 2127 is to be subtracted from the other.

Use **n** and write an equation for each of these. What does the **n** represent in each equation?

7. Eva's mother bought 3 cans of motor oil. They cost \$3.45 in all.
8. Eva's mother bought 22 L of gasoline. Each litre cost 22.3¢.
9. Eva's mother paid \$3.45 for the motor oil. Her total bill for the gasoline and motor oil was \$8.36.

PROBLEM SOLVING

Checking Up

Multiply.

1. 9.5 × 3 **2.** 9.72 × 8 **3.** 8.363 × 2 **4.** 24.6 × 5 **5.** 7.65 × 4 **6.** 5.038 × 7

7. 6 × 8.4 **8.** 5 × 2.87 **9.** 9 × 15.96 **10.** 4 × 4.977

Round and multiply to estimate each product.

11. 4.7 × 4 **12.** 6.17 × 3 **13.** 7.495 × 6 **14.** 5.8 × 5 **15.** 9.92 × 2 **16.** 31.09 × 8

How much

17. for 5 planters if each costs $4.98?

18. for 8 plants if each costs $1.49?

19. for 4 window boxes if each costs $12.95?

Multiply.

20. 6.1 × 37 **21.** 87.5 × 71 **22.** 186 × 8.5 **23.** $4.54 × 46 **24.** 279 × 1.9 **25.** 2.618 × 62

26. 38 × 5.2 **27.** 43 × $9.37 **28.** 14.9 × 93 **29.** 58 × 53.46

Round and multiply to estimate each product.

30. 54 × 6.7 **31.** 3.19 × 31 **32.** 4.905 × 26 **33.** 658 × 4.2 **34.** 8.38 × 294 **35.** $9.87 × 34

Multiply.

36. 0.01 × 75.2 **37.** 12.84 × 10

Complete.

38. 4800 mm = ▒ m **39.** 35 mm = ▒ cm

Multiply.

40. 0.6 × 0.4 **41.** 4.5 × 0.9 **42.** 5.7 × 8.6 **43.** 8.2 × 6.5 **44.** 1.6 × 5.3 **45.** 24.3 × 2.7

46. 0.8 × 6.7 **47.** 7.6 × 7.4 **48.** 3.2 × 3.8 **49.** 9.5 × 12.9

Round and multiply to estimate each product.

50. 6.8 × 8.2 **51.** 4.4 × 7.5 **52.** 6.9 × 9.6 **53.** 3.1 × 5.2 **54.** 8.3 × 7.9 **55.** 5.7 × 3.4

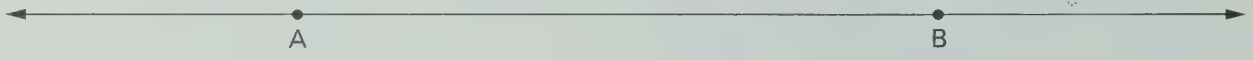
9 GEOMETRY

Lines, Line Segments, and Rays

A **line** is straight.
It continues without end
in opposite directions.

A line is named by
naming two of its points
in either order.

This is
line AB
or line BA.

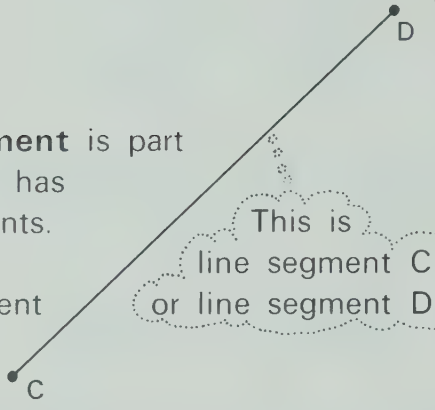


A **ray** is part of a line. It
has one end point and continues
without end in one direction.

This is
ray EF.

A ray is named by
naming its end point
first, and then one
of its other points.

A **line segment** is part
of a line. It has
two end points.

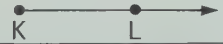
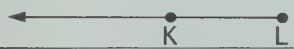


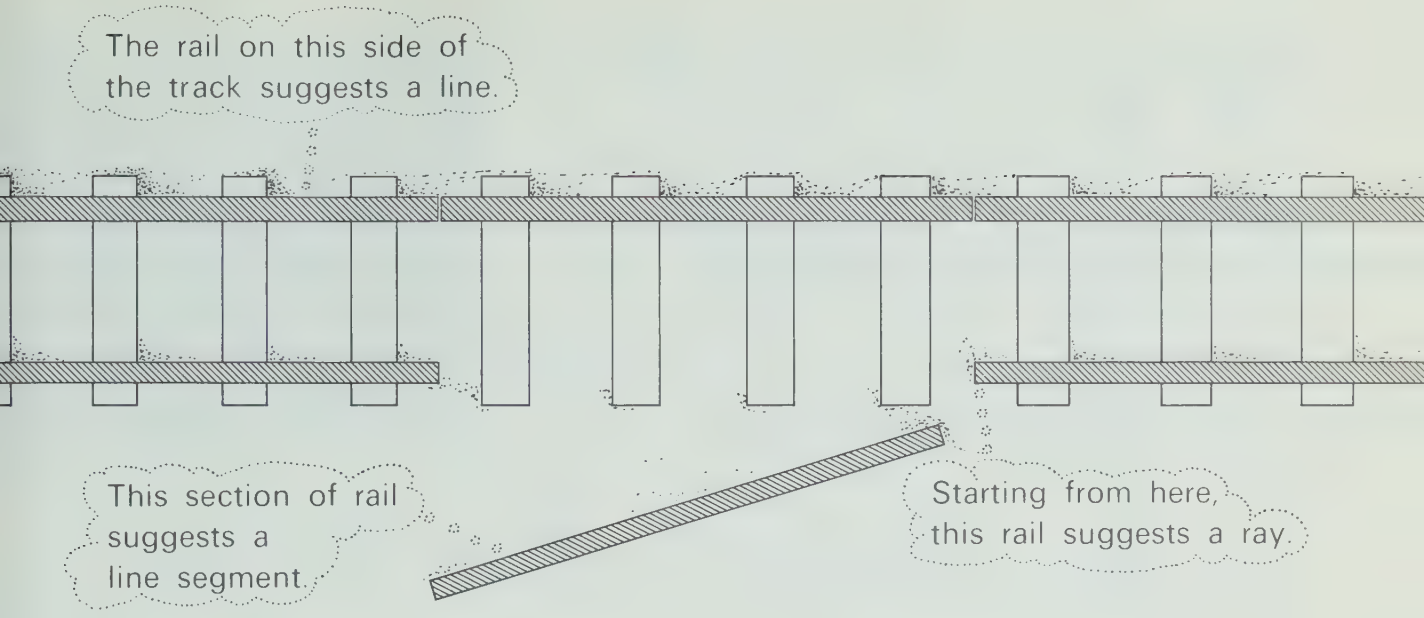
This is
line segment CD
or line segment DC.

A line segment
is named
by naming
its end points in either order.

Working Together

Study the first three rows of this chart.
Then complete the rest of the chart.

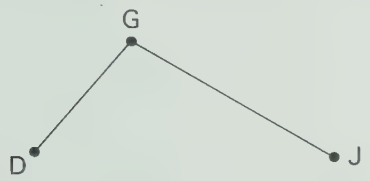
	See	Say or write	Sometimes these symbols are used.
1.		line segment AB or line segment BA	$\overline{AB}$ or $\overline{BA}$
2.		ray KL	$\overrightarrow{KL}$
3.		ray LK	$\overrightarrow{LK}$
4.		line CM or line ?	$\overleftrightarrow{CM}$ or $\overleftrightarrow{MC}$
5.	?	line segment RS or ?	$\overline{RS}$ or $\overline{SR}$
6.		?	$\overrightarrow{GH}$
7.	?	line ZY or ?	$\overleftrightarrow{ZY}$ or $\overleftrightarrow{YZ}$



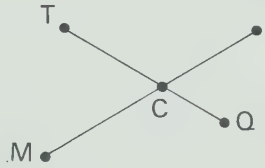
Exercises

How many line segments are there? Name them.

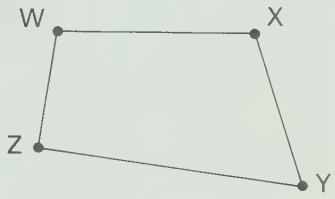
1.



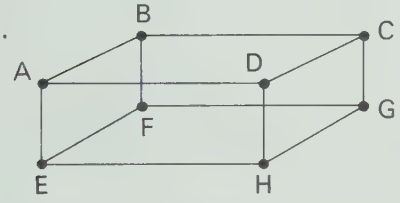
2.



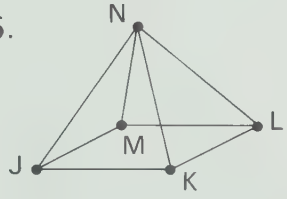
3.



4.

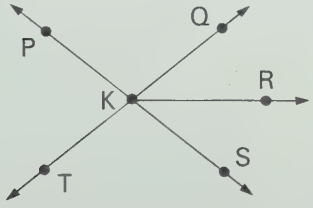


5.



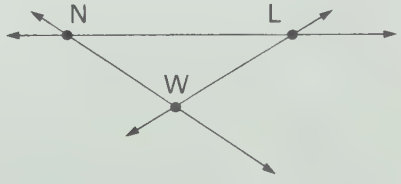
How many rays are there? Name them.

6.

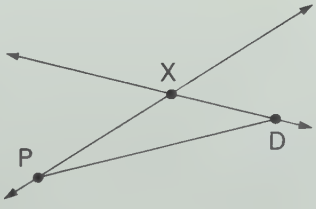


How many lines are there? Name them.

7.



8. Name two lines, two rays, and two line segments shown in this picture.



Draw and label these.

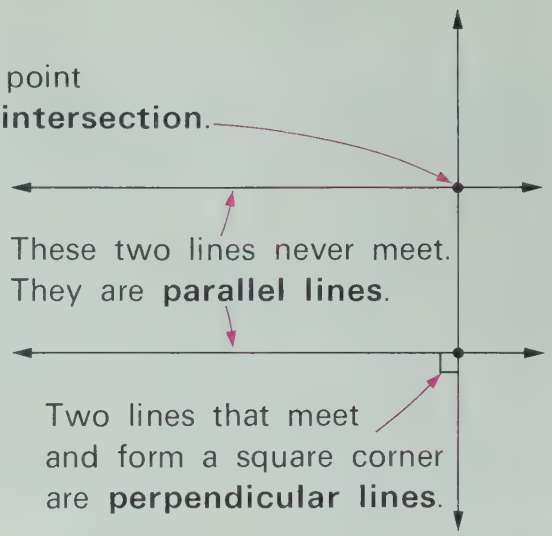
9. line TS

10. ray EF

11. line segment YU

Parallel, Intersecting, and Perpendicular Lines

Two lines that meet are **intersecting lines**. The point where they meet is their **intersection**.



These two lines never meet. They are **parallel lines**.

Two lines that meet and form a square corner are **perpendicular lines**.

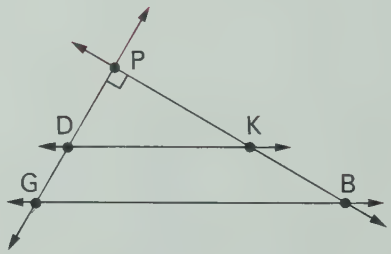
The two rails on one track suggest parallel lines.

Two tracks that meet suggest intersecting lines.

Working Together

For the lines shown,

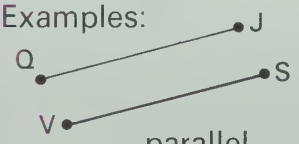
1. name two that are parallel.
2. name two that intersect and name their point of intersection.
3. name two that are perpendicular.



Line segments and rays are parallel if they belong to parallel lines.

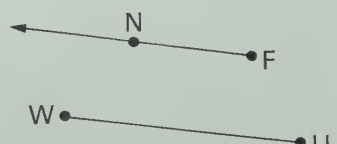
They are perpendicular if they form square corners.

Examples:

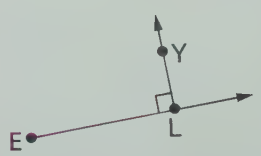


parallel

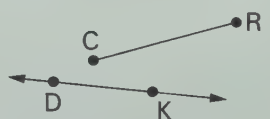
intersecting



parallel



perpendicular

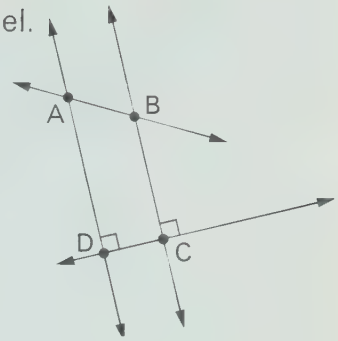


not parallel
no intersection

perpendicular

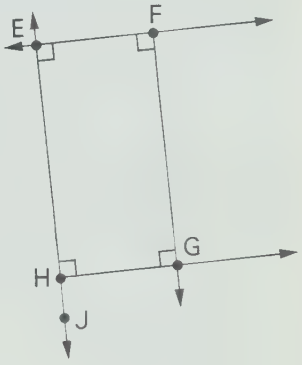
Exercises

For the lines shown,



1. name two that are parallel.
2. name two that intersect. Name their point of intersection.
3. name two that are perpendicular.

For this diagram,



4. name two intersecting line segments and their point of intersection.
5. name a line segment and a ray that are parallel.
6. name a ray and a line that are perpendicular. Also, name their point of intersection.

Draw

7. two intersecting rays.
8. two line segments that are parallel.
9. two line segments that are not parallel and do not intersect.
10. a line segment perpendicular to a ray.
11. a line segment parallel to a line.
12. line AB perpendicular to ray CD.
13. ray RE and ray RG.
14. line segment PQ parallel to ray VW.
15. line segment KL perpendicular to line ST.

Look around. Make a chart like this.

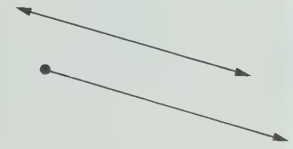
16.

Things parallel	Things perpendicular
fence posts	two edges of the corner of a picture

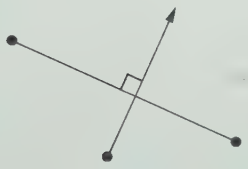
Which of these words can you use for each picture?

parallel
perpendicular
intersecting

4.



5.



Draw

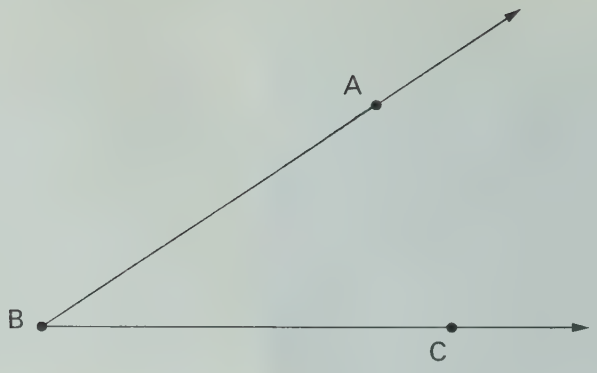
6. two parallel rays.
7. two lines that are perpendicular.

Angles

Two rays that have the same end point form an **angle**.

The common end point is the **vertex** of the angle.

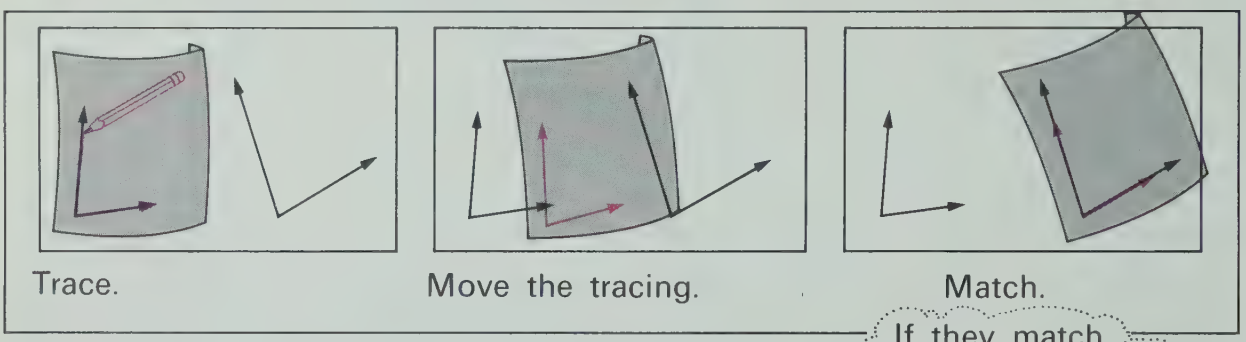
B is the vertex of this angle.



An angle is named by naming the vertex and one other point on each ray.

The vertex letter is always the middle letter in the angle name. The angle above is angle ABC or angle CBA. A shorter way to show the name is ∠ABC or ∠CBA.

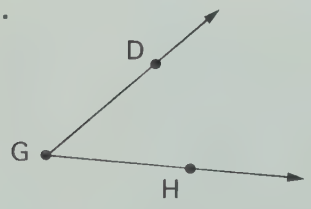
Two angles that are the same size are **congruent angles**. You can use tracing paper to test whether two angles are congruent.



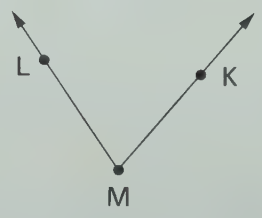
Working Together

Name each angle.

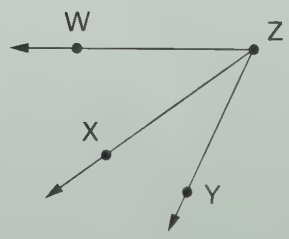
1.



2.



3.



Use tracing paper.

Draw

4. Test whether ∠DGH is congruent to ∠KML in the exercises above.

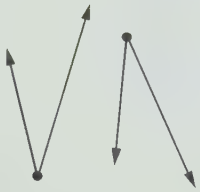
5. ∠QPR.

6. ∠GTM and ∠JTM.

Exercises

Use tracing paper.

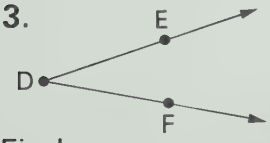
1. Test whether these two angles are congruent.



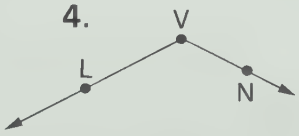
2. Test whether ∠ABC on page 174 and the angle formed by the ground and the ramp holding the truck are congruent.

Write two names for each angle shown.

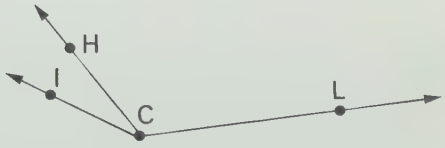
3.



4.



5.



Find

6. two angles that are congruent in Exercises 3, 4, and 5.

Draw

7. ∠WXY.

8. ∠PQR and ∠QRS.

Look around. Make a chart like this.

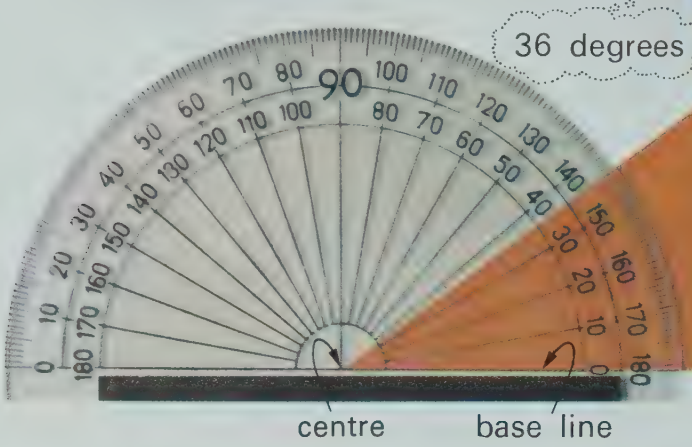
9.

Examples of angles	Examples of congruent angles
the two hands of a clock	the tips of a ★

Measuring Angles

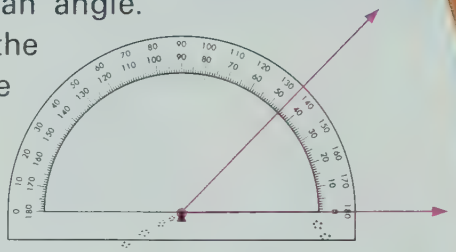
A **protractor** is used for measuring angles. The units used on a protractor are **degrees**.

The angle suggested by the star measures 36 .



Working Together

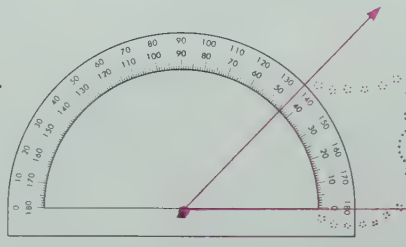
Use a straight edge and draw an angle. To measure your angle, place the base line of a protractor on the vertex of the angle. Then line up the base line of the protractor with one ray of the angle.



Place centre of protractor here.

Line up base line of protractor with one ray of the angle.

Start at 0 on the base line and move along the scale to the other ray. Read the number of degrees for the angle measurement.



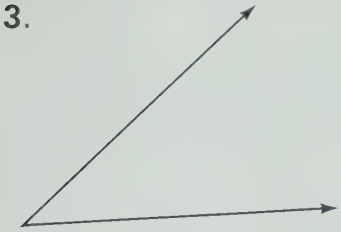
Start at 0 and move along the scale to the other ray.

1. What does your protractor show for the measurement of the angle you drew?

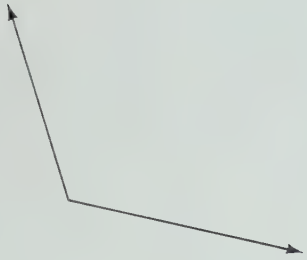
2. What does your protractor show for the measurement of the angle shown above?

Measure these angles.

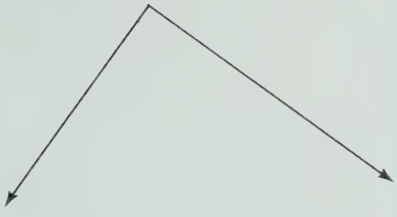
3.



4.



5.



An angle that measures 90° is a **right angle**.

An angle that measures more than 0° but less than 90° is an **acute angle**.

An angle that measures more than 90° but less than 180° is an **obtuse angle**.

6. Are the angles in the above exercises acute, right, or obtuse angles?

Exercises

Measure these angles.

For the exercises above,

7. are the angles acute, right, or obtuse angles?

Complete.

8.

Angle measurement	75	175	90	5	95	112
Kind of angle	?	?	?	?	?	?

Look around. Make a chart like this.

9.

Examples of angles	Measurement of angle	Kind of angle
peak of house	120°	obtuse

Drawing Angles

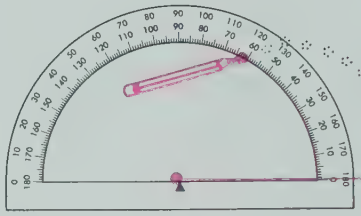
A protractor can be used to draw an angle of a certain size.

To draw an angle that measures 60°, draw a ray.

Then, place the centre of your protractor on the end point of the ray.

Line up the base line of the protractor with the ray.

Start at 0 on the base line and move along the scale to 60. Mark a dot there.

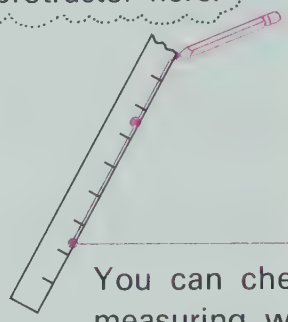


Start at 0 and move along the scale to 60. Mark a dot.

Place centre of protractor here.

Line up base line with the ray.

Draw a ray from the end point through the dot. The angle that results should measure 60°.



You can check your picture by measuring with your protractor.

Exercises

Use your protractor and draw angles that measure

1. 70°.	**2.** 40°.	**3.** 120°.	**4.** 32°.	**5.** 104°.
6. 18°.	**7.** 90°.	**8.** 177°.	**9.** 56°.	**10.** 135°.

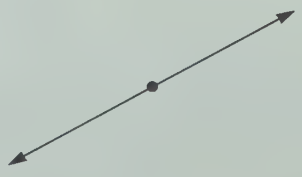
A **straight angle** is an angle that measures 180°.

The rays that form a straight angle also form a line.

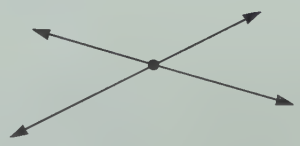
How many angles, including straight angles, are in each picture?

try this

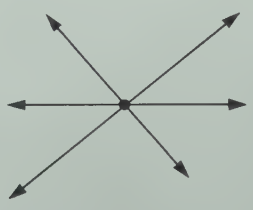
1.



2.

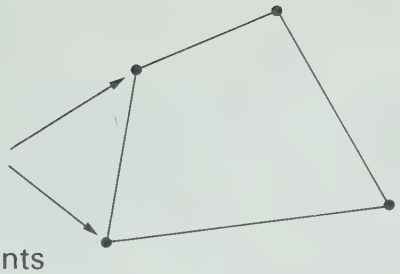


3.



Polygons

A **polygon** is formed by line segments that share end points like this.

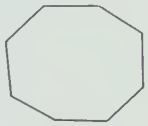


In a polygon, the line segments that meet suggest angles. These are the **angles of the polygon**.

The line segments are the **sides of the polygon**.

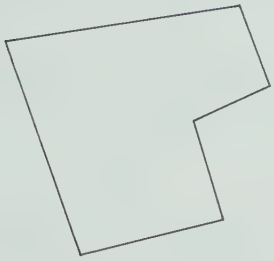
Their end points are the **vertices of the polygon**.

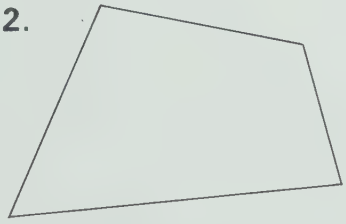
Polygons can have any number of sides.
These are the most common kinds of polygons.

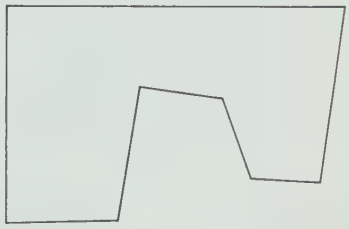
triangle	quadrilateral	pentagon	hexagon	octagon
				
3 sides	4 sides	5 sides	6 sides	8 sides

Exercises

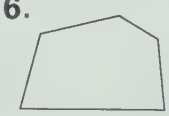
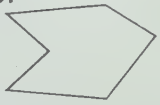
Name the kind of polygon shown.

1. 

2. 

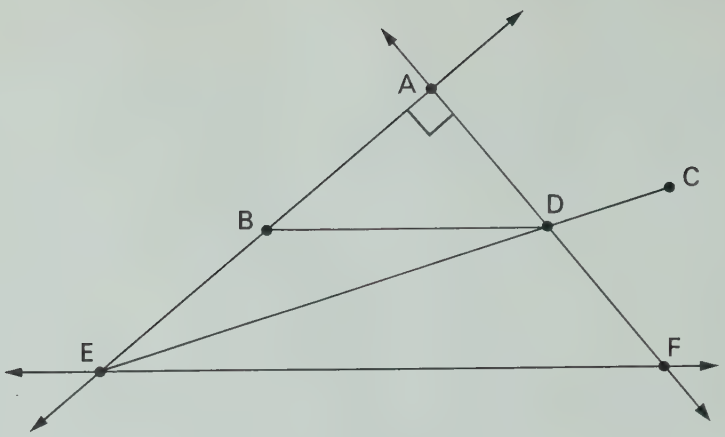
3. 

Complete.

	4.	5.	6. 	7.	8. 
Kind of polygon	?	?	?	?	?
Number of sides	?	?	?	?	?
Number of vertices	?	?	?	?	?
Number of angles	?	?	?	?	?

Practice

For the picture,



1. name three line segments.
2. name three rays.
3. name three lines.
4. name three angles.
5. name one right angle.
6. name one acute angle.
7. name one obtuse angle.
8. name a pair of parallel lines, rays, or line segments.
9. name a pair of perpendicular lines, rays, or line segments.
10. name a pair of lines, rays, or line segments that intersect. Name their point of intersection.
11. name a pair of congruent angles.

Which of these cannot be drawn?

12. two parallel lines that intersect
13. two perpendicular lines that form an angle of 90°
14. two rays that are not parallel but do not intersect
15. two angles that match by tracing but have different measurements
16. an acute right angle
17. line PQ parallel to ray QT

try this

These are **simple closed curves.**

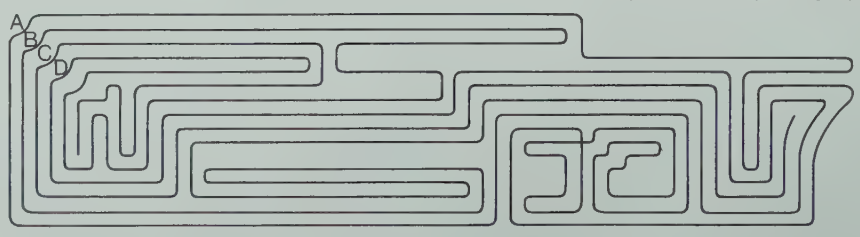
1. Which curve below is not simple?

These are closed curves that are *not simple.*

2. Which curve below is not closed?

These are simple curves that are *not closed.*

3. Two of A, B, C, and D name the same curve. Which two are they?



Name the kinds of polygons suggested by these traffic signs.

18.

19.

20.

21.

22.

23.

24.

25.

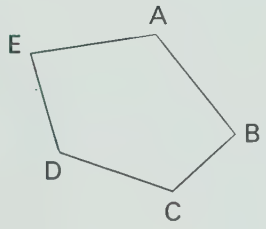
26.

27.

28.

29.

Polygons can be named by telling the kind of polygon and then naming the vertices in order.

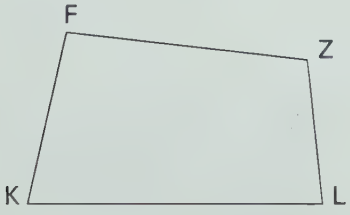


This could be called pentagon ABCDE.

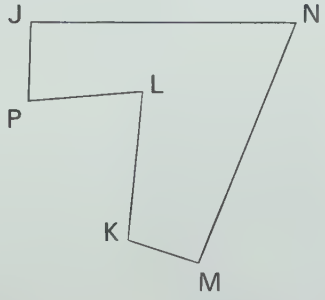
or pentagon EDCBA,
or pentagon CDEAB,
or . . .

Name each polygon.

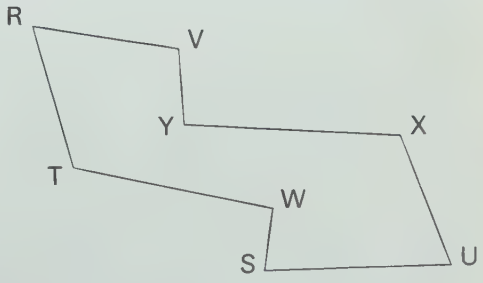
30.



31.



32.



Look around. Make a chart like this.

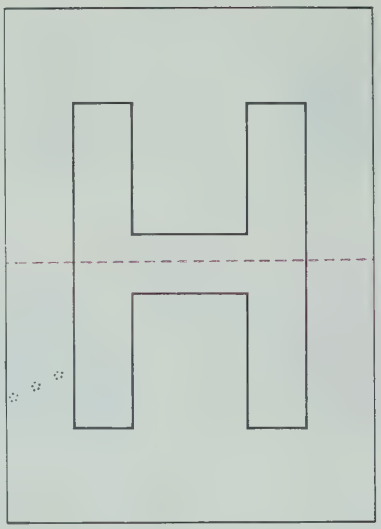
33.

Examples of polygons	Kind of polygon
home plate in baseball	*pentagon*

Line Symmetry

A shape that has **line symmetry** has two matching parts.

If the shape is on paper, one part can be folded onto the other part and the two parts will match.



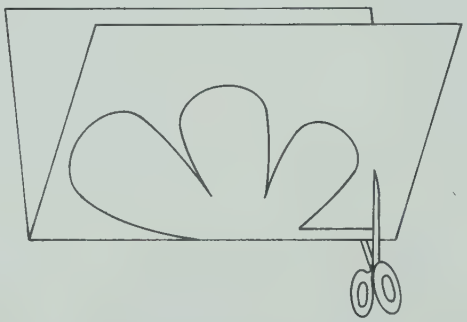
This shape has two lines of symmetry. Can you find the other one?

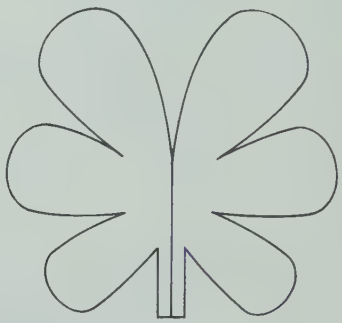
The shape could be cut out of the paper before folding if that would make it easier.

The line that separates a shape with line symmetry into two matching parts is a **line of symmetry**.

When a fold shows that a shape has line symmetry, the fold shows the line of symmetry.

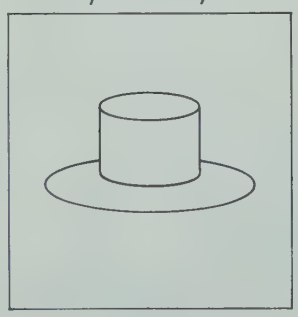
A shape with line symmetry can be made by cutting a folded piece of paper.



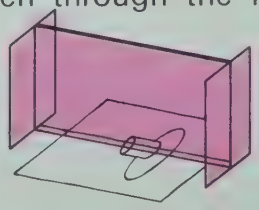


A Mira™ can help you check for line symmetry.

This shape has line symmetry . . .



. . . if the reflection of the part on this side matches the part on the other side as seen through the Mira.



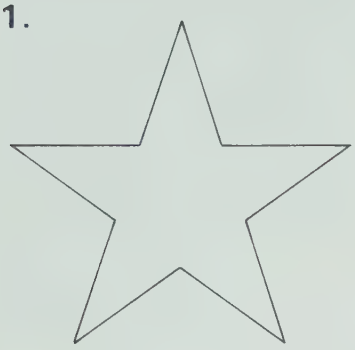
1. Find pictures that suggest line symmetry. Check for line symmetry using the Mira.

Exercises

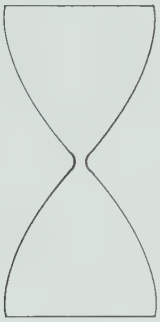
Trace each shape. Then make two folds in your tracing to show two lines of symmetry.

You can cut out your tracings if that would make it easier to check.

1.



2.



3.

Use pieces of paper folded once.

4. Cut out shapes that have line symmetry. Mark the lines of symmetry.

5. Draw pictures on folded pieces of paper as shown on page 182. Then cut out the shapes.

Use pieces of paper folded twice.

6. Cut out a shape. Mark two lines of symmetry.

7. Draw a picture on a folded piece of paper. Then cut out the shape.

Find out how

***8.** to make three folds and cut out a snowflake.

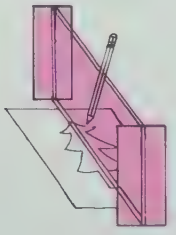
Look around.

9. Make drawings, or a list, of shapes you see with line symmetry. Show lines of symmetry in the drawings you make.

A Mira can help you draw shapes that have line symmetry.

To complete a shape having line symmetry . . .

. . . draw the other part as suggested by the reflection.



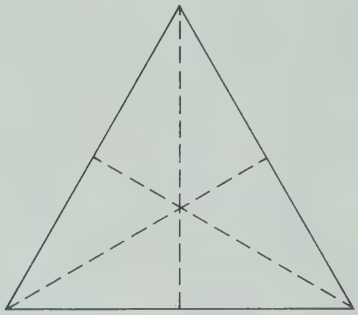
2. Use the Mira to help you draw two shapes having line symmetry.

try this

Triangles

A triangle can have all three sides the same length.

Such a triangle has three lines of symmetry.



Trace this triangle and check that

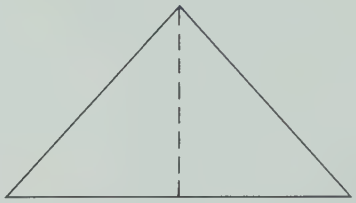
a. all three sides are the same length, and

b. there are three lines of symmetry.

A triangle with three sides the same length or with three lines of symmetry is an **equilateral triangle**.

A triangle can have just two sides the same length.

Such a triangle has just one line of symmetry.



Trace this triangle and check that

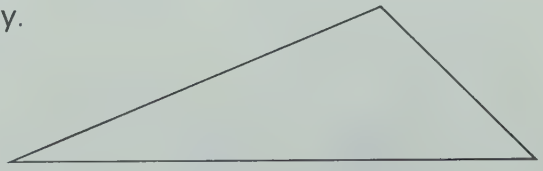
a. just two sides are the same length, and

b. there is just one line of symmetry.

A triangle with two sides the same length or with just one line of symmetry is an **isosceles triangle**.

A triangle can have all three sides with different lengths.

Such a triangle has no lines of symmetry.



Trace this triangle and check that

a. all three sides have different lengths, and

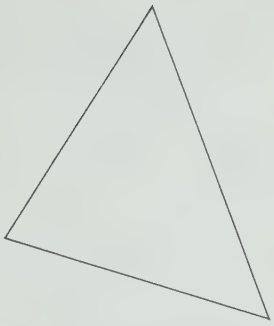
b. there are no lines of symmetry.

A triangle with all three sides different lengths or with no lines of symmetry is a **scalene triangle**.

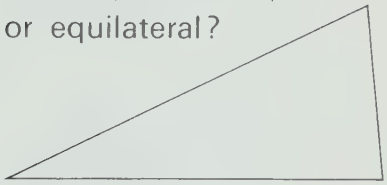
Working Together

Use tracing paper.

1. How many sides have the same length?
2. How many lines of symmetry are there?
3. Is this triangle scalene, isosceles, or equilateral?



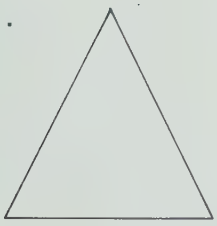
4. Is this triangle scalene, isosceles, or equilateral?



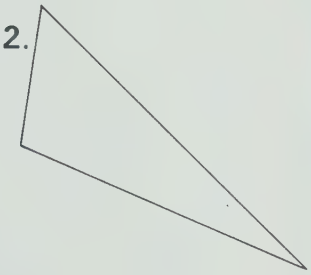
Exercises

Use tracing paper. Are these triangles scalene, isosceles, or equilateral?

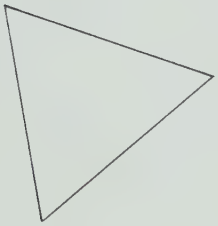
1.



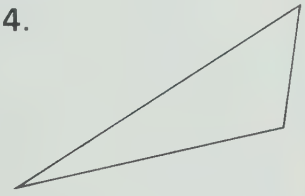
2.



3.

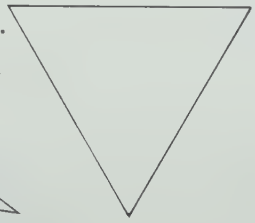


4.



5.

6.



Look around, or look at this picture, and make a chart.

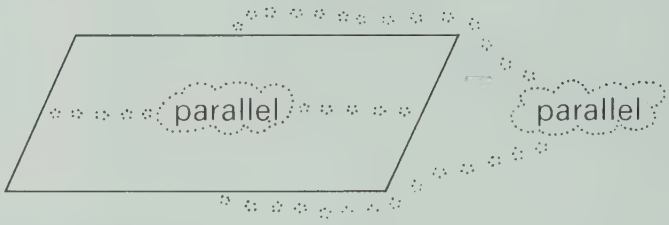
7.

Examples of triangles	Kind of triangle
top part of the letter A	isosceles

Quadrilaterals

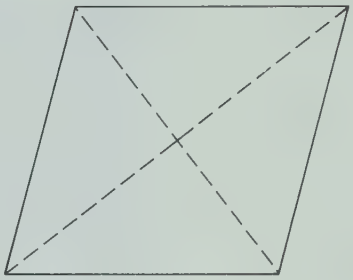
A **trapezoid** has at least one pair of parallel sides.

A **parallelogram** has two pairs of parallel sides.



A parallelogram having lines of symmetry like this is a **rhombus**.

Trace the shape and check the lines of symmetry.

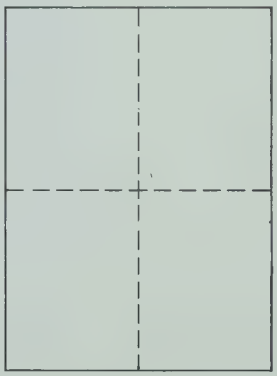


A rhombus has its four sides the same length.

Check the lengths of the four sides.

A parallelogram having lines of symmetry like this is a **rectangle**.

Trace and check the lines of symmetry.

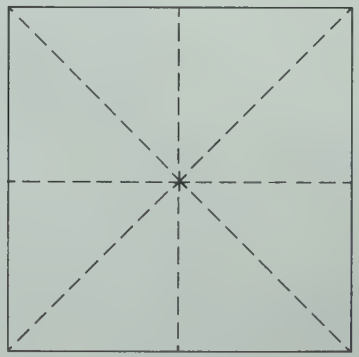


A rectangle has two pairs of sides the same length.

The angles of a rectangle suggest right angles.

A parallelogram having lines of symmetry like this is a **square**.

Trace and check the lines of symmetry.

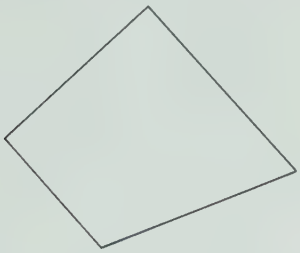


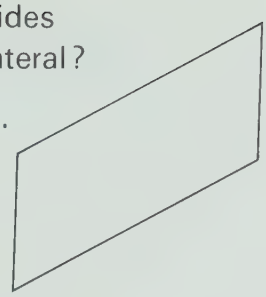
A square is both a rhombus and a rectangle.

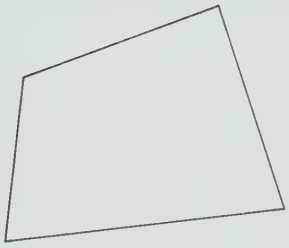
So a square has all the properties of both a rhombus and a rectangle.

Working Together

How many pairs of parallel sides appear to be in each quadrilateral?

1. 

2. 

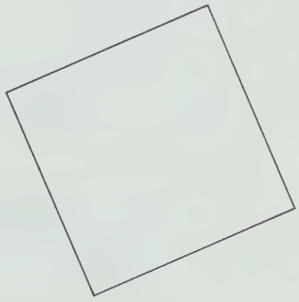
3. 

A rhombus and a rectangle each have two lines of symmetry.

4. How are their lines of symmetry different?

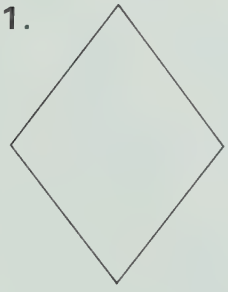
Use tracing paper.

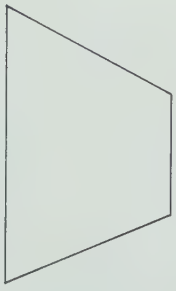
5. How many lines of symmetry are there?
6. Is this a rhombus, a rectangle, or a square?



Exercises

What kind of quadrilateral is each of these? Use tracing paper if needed.

1. 

2. 

A **kite** is a quadrilateral with one line of symmetry.

*3. Draw a kite that has no sides parallel.

Look around, or look at this picture, and make a chart.

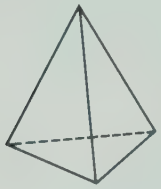
4.

Examples of quadrilaterals	Kind of quadrilateral
cover of binder	rectangle

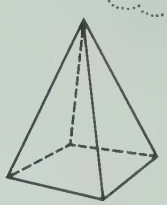
Pyramids and Prisms

A pyramid has one face as its base. Its other faces meet in a point.

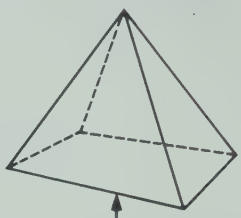
A pyramid is named by using the name of its base.



The base has the shape of a triangle. A pyramid like this is a **triangular pyramid**.



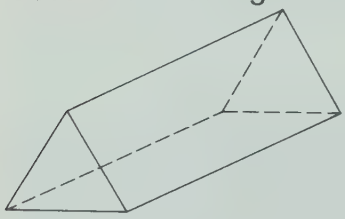
The base has the shape of a square. A pyramid like this is a **square pyramid**.



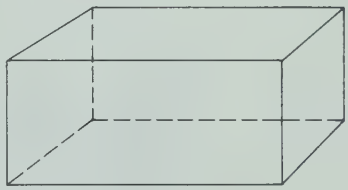
The base has the shape of a rectangle. A pyramid like this is a **rectangular pyramid**.

In a prism, the two faces on the ends can have the shape of any polygon. The other faces are rectangles or parallelograms.

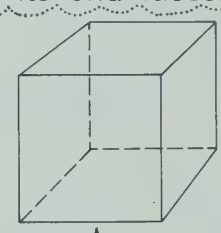
A prism is named by using the name of its end faces.



The end face has the shape of a triangle. A prism like this is a **triangular prism**.

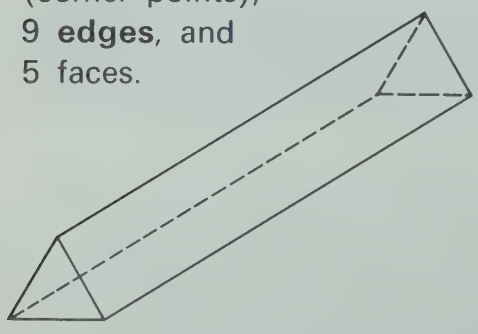


The end face has the shape of a rectangle. A prism like this is a **rectangular prism**.

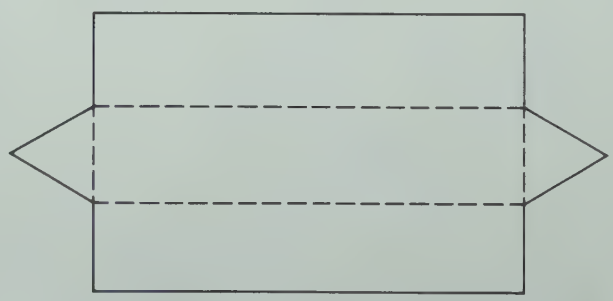


If all the faces have the shape of a square, the prism is a special one called a **cube**.

This triangular prism has 6 **vertices** (corner points), 9 **edges**, and 5 faces.



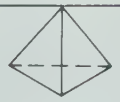
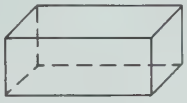
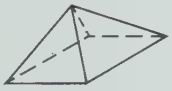
The 5 faces are seen better in this pattern for the prism.



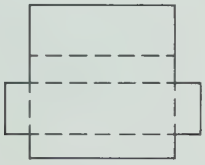
The pattern could be cut out of paper, folded, and taped to form the prism.

Exercises

Complete.

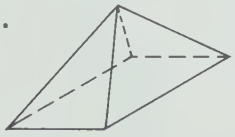
		Name of solid	Number of vertices	Number of edges	Number of faces	Shapes of the faces
1.		?	?	?	?	4 triangles
2.		?	?	?	?	?
3.		?	?	?	?	?
4.		?	?	?	?	?
5.	?	cube	?	?	?	?
6.	?	square pyramid	?	?	?	?

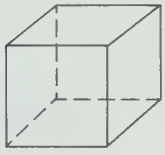
Name the solid that can be made from each pattern.

7. 

8.

Draw a pattern for each solid.

9. 

10. 

11. a square pyramid

Look around. Make a chart like this.

12.

Object	Kind of solid it suggests
cereal box	rectangular prism

Divide. Study the example if needed.

1. $4\overline{)34}$ **2.** $4\overline{)97}$ **3.** $3\overline{)59}$

4. $8\overline{)381}$ **5.** $7\overline{)532}$ **6.** $2\overline{)\$915}$

7. $9\overline{)3417}$ **8.** $2\overline{)6550}$ **9.** $3\overline{)\$50.52}$

10. $6\overline{)40\,734}$ **11.** $9\overline{)88\,888}$ **12.** $5\overline{)\$268.55}$

Example:

$$7\overline{)605} \quad 86 \text{ R3}$$

$$\begin{array}{r} 56 \\ \hline 45 \\ 42 \\ \hline 3 \end{array}$$

KEEPING SHARP

Cylinders, Spheres, and Cones

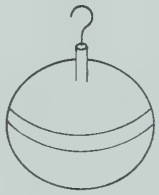
These objects have curved parts.
Which solids do the objects suggest?

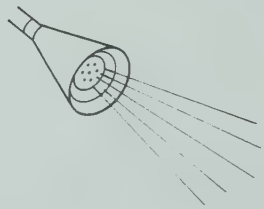
Cylinders **Spheres** **Cones**

Exercises

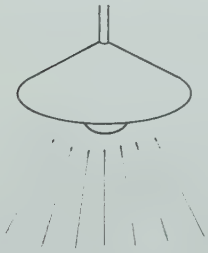
Does the shape suggest a cylinder, a sphere, or a cone?

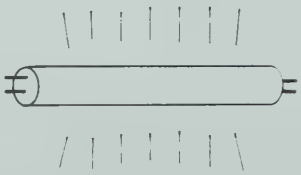
1.

2. 

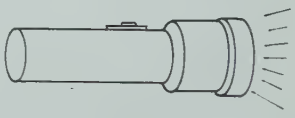
3. 

4.

5. 

6. 

7.

8. 

9. soap bubble
10. sewer pipe
11. volcano
12. skateboard wheel
13. grapefruit
14. icicle

Look around. Make a chart like this.

15.

Object with curved part	Kind of solid it suggests
funnel	cone

Solving Problems in Two or More Steps

An average is often found in two steps.

For the average cost of heat each month during the winter,

add

$$\begin{array}{r} \$\ 76.21 \\ 90.07 \\ 95.85 \\ 84.83 \\ 78.36 \\ 72.50 \\ \hline \$497.82 \end{array}$$

then divide.

$$\begin{array}{r} \$\ 82.97 \\ 6\overline{)\$497.82} \\ \underline{48} \\ 17 \\ \underline{12} \\ 58 \\ \underline{54} \\ 42 \\ \underline{42} \\ 0 \end{array}$$

The average cost of heat each month was $82.97.

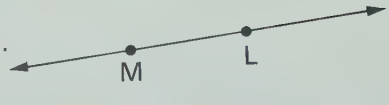
Two or more steps are needed for each of these. Solve each. Show the steps you take.

1. 8 boys shared $19.60 equally. 3 boys each kept $1.25 of his share and gave the rest to the fund drive. How much was given to the fund drive?
2. Each jar holds 75 plain olives and 38 stuffed olives. How many olives are there in 24 jars?
3. 3 golfers tied for first place in the tournament. They shared the first prize ($1000), the second prize ($750), and the third prize ($275) equally. How much did each golfer win?
4. Each of the 5 boys brought 13 books from home. Each of the 4 girls brought 22 books from home. The boys and girls then shared the books equally. How many books did each get?
5. Each of the 12 old pens holds 68 sheep. 22 sheep were moved from each pen to new pens holding 8 each. The rest were put into new pens holding 6 each. How many new pens are there?
6. 18 boxes have 144 nails each. 23 boxes have 75 nails each. How many nails are there?

PROBLEM SOLVING

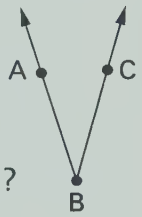
Checking Up

For the picture, name



1. a line.
2. a ray.
3. a line segment.

For the angles shown, which are



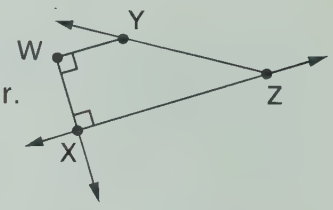
6. acute angles?
7. obtuse angles?
8. right angles?
9. congruent angles?

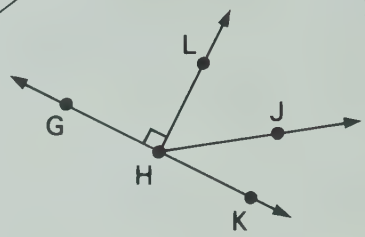
Use a protractor and measure

10. angle ABC. **11.** angle DEF.

For the picture, name lines, rays, or line segments that are

4. parallel.
5. perpendicular.



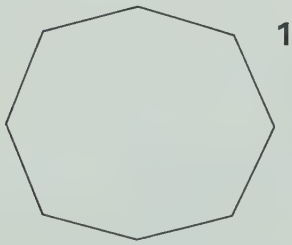


Use a protractor and draw angles that measure

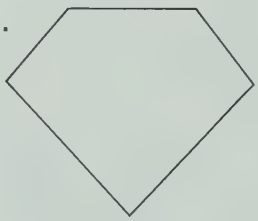
12. 65°. **13.** 130°.

Name the kind of polygon.

14.

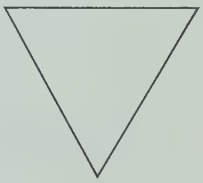


15.

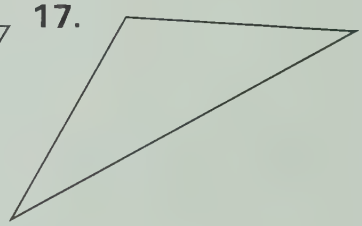


Name the kind of triangle.

16.

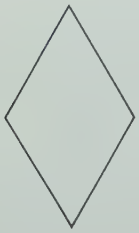


17.

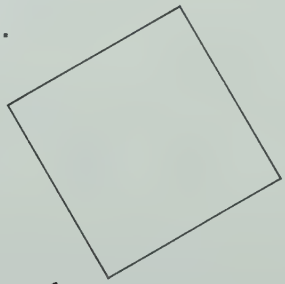


Name the kind of quadrilateral.

18.

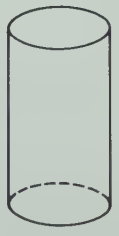


19.

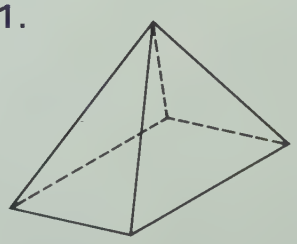


Name the kind of solid.

20.



21.



Trace and find a line of symmetry for the polygon in

22. Exercise 15.
23. Exercise 17.
24. Exercise 19.

For the solid in Exercise 21,

25. how many vertices are there?
26. how many edges are there?
27. how many faces are there?
28. what kinds of polygons are the faces?

Checking Skills

Divide.

1. $6\overline{)40}$ **2.** $3\overline{)11}$ **3.** $7\overline{)60}$

4. $8\overline{)93}$ **5.** $3\overline{)84}$ **6.** $2\overline{)54}$

7. $4\overline{)333}$ **8.** $6\overline{)498}$ **9.** $9\overline{)608}$

10. $2\overline{)189}$ **11.** $8\overline{)316}$ **12.** $7\overline{)170}$

13. $4\overline{)864}$ **14.** $5\overline{)823}$ **15.** $3\overline{)525}$

16. $6\overline{)2816}$ **17.** $9\overline{)3730}$

18. $8\overline{)7031}$ **19.** $5\overline{)4444}$

20. $4\overline{)9839}$ **21.** $2\overline{)3726}$

22. $5\overline{)47\,978}$ **23.** $6\overline{)29\,593}$

24. $9\overline{)50\,328}$ **25.** $7\overline{)18\,098}$

26. $2\overline{)\$158}$ **27.** $8\overline{)\$4704}$

28. $4\overline{)\$5.80}$ **29.** $7\overline{)\$32.83}$

30. $36 \div 5$ **31.** $50 \div 8$

32. $61 \div 9$ **33.** $70 \div 4$

34. $192 \div 3$ **35.** $348 \div 9$

36. $447 \div 7$ **37.** $419 \div 5$

38. $730 \div 2$ **39.** $890 \div 3$

40. $4917 \div 8$ **41.** $2441 \div 7$

42. $1730 \div 9$ **43.** $2571 \div 4$

44. $9112 \div 5$ **45.** $9568 \div 3$

46. $45\,113 \div 6$ **47.** $32\,704 \div 4$

48. $42\,238 \div 8$ **49.** $17\,491 \div 2$

50. $78\,987 \div 3$ **51.** $46\,666 \div 6$

52. $\$335 \div 5$ **53.** $\$7803 \div 9$

54. $\$8.89 \div 7$ **55.** $\$16.50 \div 6$

Use division to find an average.

1. 13 715 people visited the museum in 5 d.

2. Reggie cut the 675 cm of thread into 9 pieces.

3. Penny earned $224 in 8 weeks.

4. The scale showed 216 kg when the 6 children stood on it at the same time.

5. The temperature at noon each day was 28°C, 21°C, 18°C, 20°C, 26°C, 24°C, and 24°C.

6. The heights of the girls were 137 cm, 139 cm, 147 cm, and 141 cm.

7. The light bulbs lasted for 975 h, 828 h, 1048 h, 963 h, 775 h, and 1009 h.

8. The containers held 250 mL, 400 mL, 295 mL, 350 mL, 324 mL, 375 mL, 350 mL, and 400 mL.

9. The children had $1.08, $1.39, $1.48, $0.75, and $2.25.

Solve.

10. Rea's parents want to drive about the same distance each day for 3 d on a trip of 2055 km. About how far should they drive each day?

11. The grocery store chain had 48 384 balloons to give away in its 7 stores. How many balloons should be sent to each store so the stores get the same number of balloons?

10 DIVISION

Dividing by a One-Digit Number

1590 balloons were divided equally among 6 balloon vendors. How many balloons did each vendor receive?

Divide 1590 by 6. $6\overline{)1590}$

1590 shows 1 thousand. Since 1 is less than 6, think of 1 thousand 5 hundreds as 15 hundreds. Then divide the 15 hundreds.

$6 \times 2 = 12$
$6 \times 3 = 18$ . . . too great!

Use 6×2 hundreds = 12 hundreds.

Write
$$\begin{array}{r} 2 \\ 6\overline{)1590} \\ 12 \\ \hline 3 \end{array}$$

Think of the 3 hundreds 9 tens that remain as 39 tens.

$$\begin{array}{r} 2 \\ 6\overline{)1590} \\ 12\downarrow \\ \hline 39 \end{array}$$

Then divide the 39 tens.

$6 \times 6 = 36$
$6 \times 7 = 42$ . . . too great!

Use 6×6 tens = 36 tens.

Write
$$\begin{array}{r} 26 \\ 6\overline{)1590} \\ 12 \\ \hline 39 \\ 36 \\ \hline 3 \end{array}$$

Think of the 3 tens 0 ones that remain as 30 ones.

$$\begin{array}{r} 26 \\ 6\overline{)1590} \\ 12 \\ \hline 39 \\ 36\downarrow \\ \hline 30 \end{array}$$

Then divide the 30 ones.

$6 \times 5 = 30$

Write
$$\begin{array}{r} 265 \\ 6\overline{)1590} \\ 12 \\ \hline 39 \\ 36 \\ \hline 30 \\ 30 \\ \hline 0 \end{array}$$

Each vendor received 265 balloons.

Working Together

Complete.

1. $4\overline{)276}$

$$\begin{array}{r} 6\blacksquare \\ 4\overline{)276} \\ \underline{24} \\ 3\blacksquare \\ \underline{\blacksquare\blacksquare} \\ \blacksquare \end{array}$$

2. $7\overline{)6892}$

$$\begin{array}{r} 9\blacksquare\blacksquare\ \text{R}\blacksquare \\ 7\overline{)6892} \\ \underline{63} \\ 5\blacksquare \\ \underline{\blacksquare\blacksquare} \\ \blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare} \\ \blacksquare \end{array}$$

Exercises

Divide.

1. $5\overline{)215}$

2. $3\overline{)276}$

3. $4\overline{)330}$

4. $6\overline{)566}$

5. $2\overline{)6935}$

6. $7\overline{)4994}$

7. $8\overline{)2788}$

8. $5\overline{)3211}$

9. $2\overline{)72\,895}$

10. $3\overline{)28\,447}$

11. $9\overline{)68\,609}$

12. $8\overline{)51\,296}$

13. $4\overline{)21\,094}$

14. $7\overline{)36\,283}$

15. $9\overline{)3939}$

16. $5\overline{)32\,411}$

17. $6\overline{)\$10\,338}$

18. $8\overline{)\$9016}$

19. $28\,069 \div 9$

20. $42\,264 \div 8$

21. $12\,350 \div 3$

22. $3646 \div 4$

23. $\$30\,702 \div 7$

24. $\$2052 \div 6$

Copy and complete each of these.

***25.** $6\overline{)25\,78\blacksquare}$

$$\begin{array}{r} 4\blacksquare 98 \\ 6\overline{)25\,78\blacksquare} \end{array}$$

***26.** $8\overline{)\blacksquare 7\,\blacksquare 7\blacksquare}$

$$\begin{array}{r} 2\,14\blacksquare \\ 8\overline{)\blacksquare 7\,\blacksquare 7\blacksquare} \end{array}$$

***27.** $\blacksquare\overline{)55\,\blacksquare\blacksquare}$

$$\begin{array}{r} 6\,118 \\ \blacksquare\overline{)55\,\blacksquare\blacksquare} \end{array}$$

***28.** $7\overline{)\blacksquare\blacksquare\,\blacksquare\blacksquare}$

$$\begin{array}{r} 3\,221 \\ 7\overline{)\blacksquare\blacksquare\,\blacksquare\blacksquare} \end{array}$$

Divide.

3. $5\overline{)385}$

4. $9\overline{)2799}$

5. $53\,678 \div 6$

6. $\$51\,448 \div 8$

Study these division sentences.

$5 \div 5 = 1$	$5 \div 1 = 5$
$6 \div 6 = 1$	$6 \div 1 = 6$
$7 \div 7 = 1$	$7 \div 1 = 7$
$0 \div 5 = 0$	$3 \div 4 = 0$ R3
$0 \div 6 = 0$	$2 \div 4 = 0$ R2
$0 \div 7 = 0$	$1 \div 4 = 0$ R1

Divide.

1. $2\overline{)2}$ **2.** $1\overline{)9}$ **3.** $5\overline{)3}$

4. $4\overline{)0}$ **5.** $8\overline{)2}$ **6.** $4\overline{)4}$

7. $1\overline{)3}$ **8.** $6\overline{)4}$ **9.** $3\overline{)0}$

10. $8\overline{)0}$ **11.** $3\overline{)2}$ **12.** $8\overline{)8}$

13. $9\overline{)8}$ **14.** $7\overline{)3}$ **15.** $9\overline{)0}$

16. $2\overline{)1}$ **17.** $1\overline{)0}$ **18.** $1\overline{)4}$

19. $8\overline{)5}$ **20.** $3\overline{)3}$ **21.** $1\overline{)1}$

22. $9\overline{)9}$ **23.** $2\overline{)0}$ **24.** $9\overline{)7}$

25. $1\overline{)8}$ **26.** $6\overline{)3}$

27. $7\overline{)5}$ **28.** $1\overline{)2}$

29. $3\overline{)1}$ **30.** $8\overline{)4}$

try this

Zeros in the Quotient

The roller coaster ride costs 3 tickets. In 2 h, 2724 tickets were collected for the roller coaster. How many rides were taken on the roller coaster in 2 h?

Divide 2724 by 3. $3\overline{)2724}$

2724 shows 2 thousands. Since 2 is less than 3, think of 2 thousands 7 hundreds as 27 hundreds.
Then divide the 27 hundreds.

$3 \times 9 = 27$

Use 3×9 hundreds = 27 hundreds.

Write
$$\begin{array}{r} 9 \\ 3\overline{)2724} \\ 27 \\ \hline 0 \end{array}$$

There are 0 hundreds left, but there are still 2 tens to divide.

$$\begin{array}{r} 9 \\ 3\overline{)2724} \\ 27\downarrow \\ \hline 02 \end{array}$$

Divide the 2 tens.

Since 2 is less than 3, write 0 in the tens place.

Write
$$\begin{array}{r} 90 \\ 3\overline{)2724} \\ 27 \\ \hline 02 \end{array}$$

Think of the 2 tens 4 ones that remain as 24 ones.

$$\begin{array}{r} 90 \\ 3\overline{)2724} \\ 27\downarrow \\ \hline 024 \end{array}$$

Then divide the 24 ones.

$3 \times 8 = 24$

Write
$$\begin{array}{r} 908 \\ 3\overline{)2724} \\ 27 \\ \hline 024 \\ 24 \\ \hline 0 \end{array}$$

The zero is needed in the quotient to show that 2724 divided by 3 is 908 and not 98.

908 rides were taken on the roller coaster in 2 h.

Working Together

Give the next digit
for each quotient.

1. $\begin{array}{r} 7 \\ 6\overline{)420} \\ \underline{42} \\ 00 \end{array}$

2. $\begin{array}{r} 3 \\ 2\overline{)609} \\ \underline{6} \\ 00 \end{array}$

3. $\begin{array}{r} 4\,0 \\ 3\overline{)12\,027} \\ \underline{12} \\ 0\,02 \end{array}$

Complete.

4. $\begin{array}{r} 2\blacksquare\blacksquare \\ 5\overline{)1015} \\ \underline{10} \\ 01\blacksquare \\ \underline{\blacksquare\blacksquare} \\ \blacksquare \end{array}$

5. $\begin{array}{r} 6\,7\blacksquare\blacksquare \\ 8\overline{)53\,600} \\ \underline{48} \\ 5\,6 \\ \underline{\blacksquare\blacksquare} \\ \blacksquare\blacksquare \end{array}$

6. $\begin{array}{r} 9\,\blacksquare\blacksquare\blacksquare \text{ R}\blacksquare \\ 7\overline{)63\,214} \\ \underline{63} \\ \blacksquare\blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare} \\ \blacksquare \end{array}$

Divide.

7. $6\overline{)6335}$

8. $9\overline{)\$63\,009}$

9. $\$120.80 \div 4$

Exercises

Divide.

1. $2\overline{)180}$

2. $5\overline{)3350}$

3. $4\overline{)242}$

4. $6\overline{)37\,383}$

5. $3\overline{)27\,272}$

6. $9\overline{)7254}$

7. $7\overline{)14\,030}$

8. $8\overline{)48\,244}$

9. $7\overline{)37\,122}$

10. $6\overline{)3000}$

11. $4\overline{)30\,803}$

12. $9\overline{)72\,050}$

13. $6\overline{)48\,000}$

14. $8\overline{)24\,322}$

15. $9519 \div 5$

16. $2720 \div 3$

17. $18\,199 \div 2$

18. $6086 \div 8$

19. $54\,005 \div 9$

20. $43\,804 \div 6$

21. $2802 \div 7$

22. $10\,382 \div 5$

23. $\$6356 \div 7$

24. $\$18\,603 \div 3$

Practice

Divide. Then check the six most difficult exercises.

Remember you can multiply the divisor and the quotient, then add the remainder to check your work.

1. $7\overline{)602}$	**2.** $4\overline{)360}$	**3.** $8\overline{)567}$	**4.** $5\overline{)\$245}$
5. $6\overline{)2723}$	**6.** $9\overline{)6318}$	**7.** $6\overline{)2404}$	**8.** $8\overline{)\$5680}$
9. $2\overline{)1002}$	**10.** $8\overline{)1460}$	**11.** $3\overline{)1507}$	**12.** $4\overline{)\$3372}$
13. $4\overline{)5032}$	**14.** $7\overline{)33\,810}$	**15.** $5\overline{)21\,029}$	**16.** $6\overline{)\$24\,174}$
17. $8\overline{)38\,404}$	**18.** $3\overline{)21\,005}$	**19.** $9\overline{)63\,454}$	**20.** $8\overline{)\$32\,000}$
21. $434 \div 9$	**22.** $494 \div 7$	**23.** $1529 \div 3$	**24.** $\$21.50 \div 5$
25. $2000 \div 4$	**26.** $4784 \div 8$	**27.** $42\,002 \div 6$	**28.** $\$98.74 \div 2$
29. $12\,178 \div 3$	**30.** $33\,333 \div 6$	**31.** $26\,454 \div 5$	**32.** $\$320.36 \div 4$

Solve.

33. Sandy and her six friends earned $39.90 at the fair. If they share the money equally, how much will each have?

34. Jim and his seven friends have 102 tickets altogether. How many rides that cost 2 tickets each can they take?

35. The Wild Mouse costs 4 tickets. Each of 29 students has 27 tickets. How many rides on the Wild Mouse can they take?

36. Each of 23 students has 19 tickets. How many rides costing 3 tickets will their tickets buy?

Help Martha find the path to the Ferris wheel by following the exercises with even remainders.

	$4\overline{)20\,015}$	$9\overline{)54\,809}$	$6\overline{)1222}$	$7\overline{)4517}$
$3\overline{)18\,032}$	$6\overline{)545}$	$3\overline{)12\,008}$	$8\overline{)1779}$	$5\overline{)3042}$
$9\overline{)9566}$	$5\overline{)15\,023}$	$7\overline{)629}$	$6\overline{)25\,813}$	$8\overline{)24\,038}$
$4\overline{)2242}$	$7\overline{)2869}$	$3\overline{)776}$	$4\overline{)16\,037}$	$9\overline{)4171}$
$2\overline{)4937}$	$5\overline{)6878}$	$8\overline{)3279}$	$6\overline{)4324}$	Ferris wheel

Dividing Evenly by a Multiple of 10

Byron and his brother are arranging 1200 chairs in rows for a concert. They are placing 30 chairs in each row. How many rows will there be?

Divide 1200 by 30.

1200 shows 1 thousand.
1200 shows 12 hundreds.

Since
12 is less than 30, think of
12 hundreds 0 tens as 120 tens.
Then divide the 120 tens.

$30 \times 4 = 120$

Use 30×4 tens $= 120$ tens.

Write
$$\begin{array}{r} 4 \\ 30\overline{)1200} \\ 120 \\ \hline 0 \end{array}$$

There are 0 tens 0 ones left to divide.

There will be 40 rows.

$$\begin{array}{r} 4 \\ 30\overline{)1200} \\ 120\downarrow \\ \hline 00 \end{array}$$

$30 \times 0 = 0$

Write
$$\begin{array}{r} 40 \\ 30\overline{)1200} \\ 120 \\ \hline 00 \end{array}$$

Working Together

Divide.

1. $30\overline{)60}$ **2.** $80\overline{)4000}$ **3.** $30\,000 \div 60$ **4.** $720\,000 \div 90$

Exercises

Divide.

1. $30\overline{)90}$ **2.** $50\overline{)3500}$ **3.** $20\overline{)600}$ **4.** $40\overline{)160\,000}$

5. $80\overline{)32\,000}$ **6.** $10\overline{)40\,000}$ **7.** $90\overline{)810}$ **8.** $70\overline{)7000}$

9. $4800 \div 60$ **10.** $300\,000 \div 50$ **11.** $2700 \div 30$ **12.** $10\,000 \div 20$

13. $36\,000 \div 40$ **14.** $6300 \div 90$ **15.** $420 \div 70$ **16.** $560\,000 \div 80$

Dividing by a Multiple of 10

Shin took 1300 photographs of the fair. He took 20 photographs with each roll of film. How many rolls of film did he use?

Divide 1300 by 20.

1300 shows 1 thousand 3 hundreds or 13 hundreds. Since 13 is less than 20, think of 13 hundreds 0 tens as 130 tens. Then divide the 130 tens.

$20 \times 6 = 120$
$20 \times 7 = 140$ . . . too great!

Use 20×6 tens $= 120$ tens.

Write
$$\begin{array}{r} 6 \\ 20\overline{)1300} \\ 120 \\ \hline 10 \end{array}$$

Think of the 10 tens 0 ones that remain as 100 ones.

$$\begin{array}{r} 6 \\ 20\overline{)1300} \\ 120\downarrow \\ \hline 100 \end{array}$$

Then divide the 100 ones.

$20 \times 5 = 100$

Write
$$\begin{array}{r} 65 \\ 20\overline{)1300} \\ 120 \\ \hline 100 \\ 100 \\ \hline 0 \end{array}$$

Shin used 65 rolls of film.

Working Together

Complete.

1. $70\overline{)6520}$

$$\begin{array}{r} 9\blacksquare\text{ R}\blacksquare \\ 70\overline{)6520} \\ 630 \\ \hline \blacksquare \\ \blacksquare \\ \hline \blacksquare \end{array}$$

Divide. Then check.

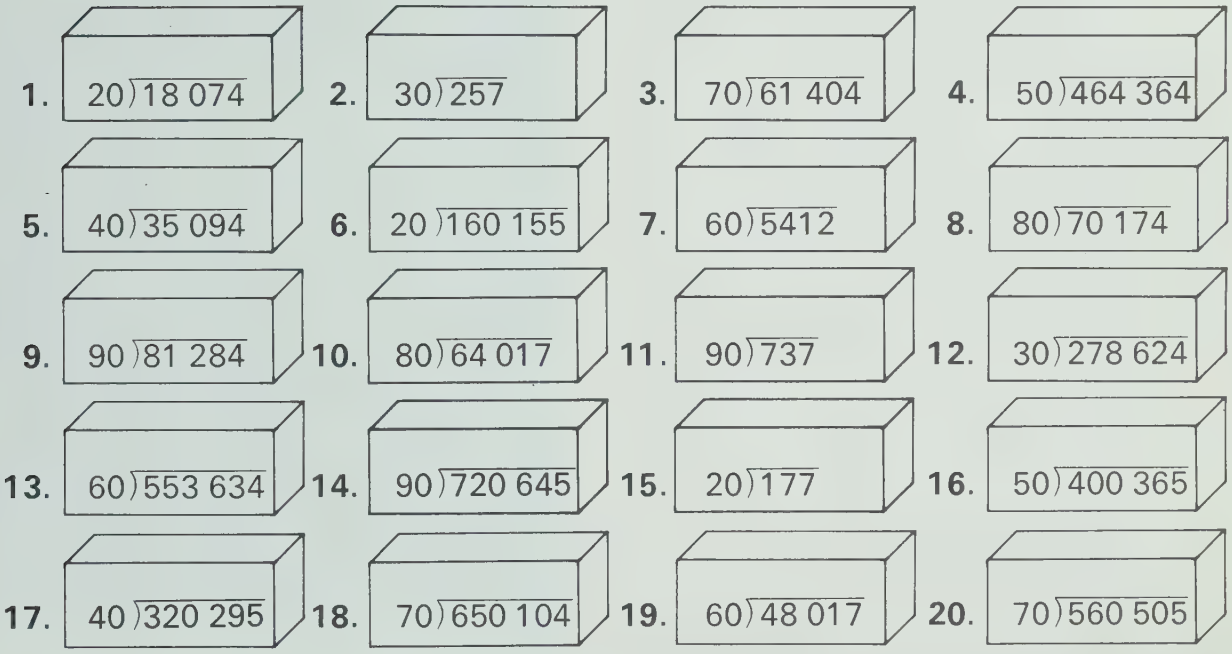
2. $50\overline{)280}$
3. $30\overline{)1920}$
4. $31\,347 \div 60$
5. $84\,040 \div 80$

Exercises

Divide as shown on each box of film. Match each result to the photograph topics in this chart. Then name the topic of the photographs.

Example: $80\overline{)7212}$ 90 R12, 720, 12 — concerts

Result	Topics of the photographs
8 R17	Agriculture
90 R12	Concerts
800 R17	Contests
9227 R14	Exhibits
877 R14	Fireworks
9287 R14	Games
903 R14	Parades
8007 R15	Rides



21. Use a tally chart to show the number of rolls of film for each topic.

22. Draw a graph to show the number of photographs of each topic if each film contains 20 photographs.

Solve.

23. Shin took 2000 photographs with 50 rolls of film. He took the same number of photographs with each roll of film. How many photographs did he take with each roll of film?

24. Shin took 1200 photographs. He took 30 photographs with each roll of film. How many rolls of film did he use?

Dividing by a Two-Digit Number

In August, 1178 t of garbage were collected at a fairgrounds. What was the average mass of garbage collected each day?

The symbol t stands for **tonne**.

1 t = 1000 kg

Divide 1178 by 31.

For $31\overline{)1178}$, think of $30\overline{)1178}$.

1178 shows 1 thousand 1 hundred or 11 hundreds. Since 11 is less than 30, think of 11 hundreds 7 tens as 117 tens. Then divide the 117 tens.

$30 \times 3 = 90$
$30 \times 4 = 120$ . . . too great!

Use 31×3 tens $= 93$ tens.

Write
$$\begin{array}{r} 3 \\ 31\overline{)1178} \\ 93 \\ \hline 24 \end{array}$$

Think of the 24 tens 8 ones that remain as 248 ones.

$$\begin{array}{r} 3 \\ 31\overline{)1178} \\ 93\downarrow \\ \hline 248 \end{array}$$

Then divide the 248 ones.

$30 \times 8 = 240$
$30 \times 9 = 270$ . . . too great!

Use $31 \times 8 = 248$.

Write
$$\begin{array}{r} 38 \\ 31\overline{)1178} \\ 93 \\ \hline 248 \\ 248 \\ \hline 0 \end{array}$$

The average mass of garbage collected each day was 38 t.

Working Together

For each, give the divisor you could think of to help you find the quotient.

1. $12\overline{)4838}$ **2.** $71\overline{)7526}$

Complete.

3.
$$\begin{array}{r} 7\blacksquare\ \text{R}\blacksquare \\ 51\overline{)3586} \\ \underline{357} \\ 16 \end{array}$$

4.
$$\begin{array}{r} 6\blacksquare \\ 43\overline{)2666} \\ \underline{258} \\ \blacksquare \\ \blacksquare \\ \hline \blacksquare \end{array}$$

Divide.
Then check.

5. $64\overline{)327}$

6. $81\overline{)20\,272}$

7. $93\overline{)30\,699}$

8. $32\overline{)\$67\,456}$

Exercises

Divide.

1. $41\overline{)328}$ **2.** $62\overline{)411}$ **3.** $54\overline{)873}$ **4.** $83\overline{)625}$

5. $51\overline{)4325}$ **6.** $21\overline{)2526}$ **7.** $94\overline{)7683}$ **8.** $63\overline{)3194}$

9. $43\overline{)39\,184}$ **10.** $84\overline{)37\,168}$ **11.** $92\overline{)40\,020}$ **12.** $52\overline{)42\,082}$

13. $11\overline{)66\,027}$ **14.** $72\overline{)108\,577}$ **15.** $81\overline{)248\,730}$ **16.** $93\overline{)306\,999}$

17. $19\,152 \div 42$ **18.** $68\,125 \div 74$ **19.** $13\,488 \div 12$

20. $\$22\,387 \div 61$ **21.** $\$11\,077 \div 53$ **22.** $\$59\,942 \div 82$

23. $\$762\,680 \div 23$ **24.** $\$296\,143 \div 31$ **25.** $\$101\,244 \div 44$

Solve.

26. 492 kg of garbage were collected from a dozen pavilions. What was the average amount of garbage collected from each pavilion?

27. There are 11 rides on 14 652 m^2 of fairground. What is the average amount of space for each ride?

28. The same number of lightbulbs was used for each of 22 pavilions. 4510 lightbulbs were used altogether. How many lightbulbs were used for each pavilion?

29. 132 kg of nails were used to build 33 stands at a fair. What was the average mass of nails used to build each stand?

Rounding the Divisor

Cecil and his friends collected 3104 pop bottles at the fair and placed them in cases of 48. How many full cases of bottles did they collect? How many bottles for another case did they collect?

Divide 3104 by 48.

For $48\overline{)3104}$, think of $50\overline{)3104}$.

48 rounded to the nearest ten is 50.

3104 shows 3 thousands 1 hundred or 31 hundreds. Since 31 is less than 50, think of 31 hundreds 0 tens as 310 tens. Then divide the 310 tens.

$50 \times 6 = 300$
$50 \times 7 = 350$ . . . too great!

Use 48×6 tens $= 288$ tens.

Write
$$\begin{array}{r} 6 \\ 48\overline{)3104} \\ 288 \\ \hline 22 \end{array}$$

Think of the 22 tens 4 ones that remain as 224 ones.

$$\begin{array}{r} 6 \\ 48\overline{)3104} \\ 288\downarrow \\ \hline 224 \end{array}$$

Then divide the 224 ones.

$50 \times 4 = 200$
$50 \times 5 = 250$

Use $48 \times 4 = 192$.

Write
$$\begin{array}{r} 64 \text{ R32} \\ 48\overline{)3104} \\ 288 \\ \hline 224 \\ 192 \\ \hline 32 \end{array}$$

They collected 64 full cases of bottles and 32 bottles for another case.

Working Together

Round to the nearest ten.

1. 63 **2.** 78 **3.** 35

Complete.

4.
$$\begin{array}{r} 6\square\ \text{R}\square \\ 94\overline{)6120} \\ \underline{564} \\ 48\square \\ \underline{\square\square} \\ \square \end{array}$$

5.
$$\begin{array}{r} 3\square\square\ \text{R}\square \\ 29\overline{)10\,336} \\ \underline{87} \\ 163 \\ \underline{\square\square} \\ \square\square \\ \underline{\square\square} \\ \square \end{array}$$

Divide.

6. $76\overline{)574}$

7. $31\overline{)2859}$

8. $418\,141 \div 52$

9. $\$1068.90 \div 21$

Exercises

Divide.

1. $22\overline{)792}$ **2.** $87\overline{)663}$ **3.** $64\overline{)539}$ **4.** $35\overline{)870}$

5. $11\overline{)1786}$ **6.** $37\overline{)2053}$ **7.** $45\overline{)1660}$ **8.** $88\overline{)3970}$

9. $61\overline{)44\,103}$ **10.** $19\overline{)84\,600}$ **11.** $33\overline{)76\,109}$ **12.** $47\overline{)41\,162}$

13. $23\overline{)138\,098}$ **14.** $46\overline{)362\,320}$ **15.** $78\overline{)332\,110}$ **16.** $92\overline{)277\,092}$

17. $49\,210 \div 28$ **18.** $56\,928 \div 85$ **19.** $34\,172 \div 69$

20. $\$260.15 \div 43$ **21.** $\$6480.72 \div 72$ **22.** $\$1435.90 \div 83$

Use the quotient in each block as the missing divisor in the next.

23.	$2132 \div 52$	$2378 \div$ ▒	$5182 \div$ ▒	$36\,144 \div$ ▒
24.	$4874 \div 77$	$3591 \div$ ▒	$1834 \div$ ▒	$129\,988 \div$ ▒

Solve.

25. At the fair, Marvin sold 2246 tickets. Each book of tickets has 48 tickets. How many whole books of tickets did he sell? How many tickets from another book did he sell?

***26.** Each carton has 36 cans of juice. Gina sold cans of juice for 30¢ each. She received $385.20 for the cans of juice. How many whole cartons of cans of juice did she sell? How many cans from another carton did she sell?

Dividing by a Two-Digit Number

Divide 6558 by 84.

For $84\overline{)6558}$,
think of $80\overline{)6558}$.

84 rounded to the nearest ten is 80.

For $80\overline{)6558}$, think of
6558 as 655 tens 8 ones.
Then divide the 655 tens.

$80 \times 8 = 640$
$80 \times 9 = 720$ . . . too great!

Try using 84×8 tens.

84×8 tens = 672 tens

$$\begin{array}{r} 8 \\ 84\overline{)6558} \\ 672 \end{array}$$

cannot subtract 672 from 655

Use 84×7 tens instead.

84×7 tens = 588 tens

$$\begin{array}{r} 7 \\ 84\overline{)6558} \\ 588 \\ \hline 67 \end{array}$$

Then complete the division.

$$\begin{array}{r} 78 \text{ R6} \\ 84\overline{)6558} \\ 588 \\ \hline 678 \\ 672 \\ \hline 6 \end{array}$$

$6558 \div 84 = 78$ R6

Divide 5493 by 66.

For $66\overline{)5493}$,
think of $70\overline{)5493}$.

66 rounded to the nearest ten is 70.

For $70\overline{)5493}$, think of
5493 as 549 tens 3 ones.
Then divide the 549 tens.

$70 \times 7 = 490$
$70 \times 8 = 560$ . . . too great!

Try using 66×7 tens.

66×7 tens = 462 tens

$$\begin{array}{r} 7 \\ 66\overline{)5493} \\ 462 \\ \hline 87 \end{array}$$

greater than the divisor

Use 66×8 tens instead.

66×8 tens = 528 tens

$$\begin{array}{r} 8 \\ 66\overline{)5493} \\ 528 \\ \hline 21 \end{array}$$

Then complete the division.

$$\begin{array}{r} 83 \text{ R15} \\ 66\overline{)5493} \\ 528 \\ \hline 213 \\ 198 \\ \hline 15 \end{array}$$

$5493 \div 66 = 83$ R15

Working Together

Complete.

1. $64\overline{)4350}$

$$\begin{array}{r} 6\blacksquare\ R\blacksquare \\ 64\overline{)4350} \\ \underline{384} \\ 510 \\ \blacksquare\blacksquare \\ \hline \blacksquare \end{array}$$

2. $47\overline{)9748}$

$$\begin{array}{r} 2\blacksquare\blacksquare\ R\blacksquare \\ 47\overline{)9748} \\ \underline{94} \\ 34\blacksquare \\ \blacksquare\blacksquare \\ \hline \blacksquare \end{array}$$

Divide. Then check.

3. $26\overline{)886}$

4. $12\overline{)3165}$

5. $\$73\,416 \div 92$

6. $\$2114.70 \div 35$

Exercises

Divide. Check the six most difficult exercises.

1. $52\overline{)153}$	**2.** $29\overline{)265}$	**3.** $73\overline{)948}$	**4.** $86\overline{)710}$
5. $34\overline{)6574}$	**6.** $23\overline{)6002}$	**7.** $19\overline{)7986}$	**8.** $67\overline{)5772}$
9. $27\overline{)67\,518}$	**10.** $75\overline{)46\,229}$	**11.** $42\overline{)74\,660}$	**12.** $18\overline{)37\,200}$
13. $37\overline{)106\,250}$	**14.** $53\overline{)206\,324}$	**15.** $74\overline{)412\,984}$	**16.** $81\overline{)321\,123}$

17. $\$58\,575 \div 55$ **18.** $\$94\,458 \div 21$ **19.** $\$256\,496 \div 92$

20. $\$371.68 \div 46$ **21.** $\$487.50 \div 65$ **22.** $\$3336.08 \div 44$

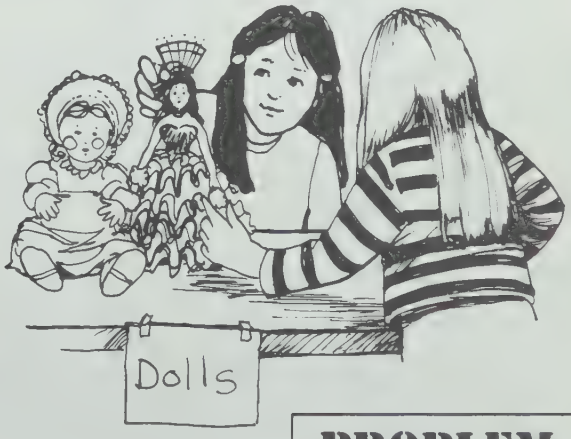
Use division to solve each of these. Tell what you would do with the remainder to get the most reasonable answer.

1. Sandy and Chris arranged 425 exhibits on tables. Each table holds 16 exhibits. How many tables did they need?

2. They packed 107 prizes in boxes. Each box holds 8 prizes. How many boxes did they fill?

3. Sandy and Chris shared $125 equally for their work at the fair. How much did each receive?

4. Sandy and Chris were to share 53 tickets for rides. How many tickets would each receive?



PROBLEM SOLVING

Estimating the Quotient

A tally chart that was used one day showed that a game was played 1729 times and 91 prizes were won. About how many times was the game played for each prize won?

Rounding the divisor and the dividend can help you to estimate the quotient.

For $91\overline{)1729}$,

round ↓ ↓

$90\overline{)1700}$

For $90\overline{)1700}$, think

1 or 2? . . . 2 is closer!

$9\overline{)17}$

Use 2 in the quotient.

the rounded divisor

$9 \times 2 = 18$

$90 \times 2 = 180$

$90 \times 20 = 1800$

1800 is close to 1700!

20 is an estimate for $1729 \div 91$.

The game was played about 20 times for each prize that was won.

For the exact quotient, divide in the usual way.

$$\begin{array}{r} 19 \\ 91\overline{)1729} \\ \underline{91} \\ 819 \\ \underline{819} \\ 0 \end{array}$$

Working Together

Give the rounded divisor and the rounded dividend.

1. $64\overline{)8249}$ **2.** $75\overline{)6385}$

Give the first digit in the quotient.

3. $47\overline{)32\,987}$

Give the number of digits in the quotient.

4. $64\overline{)5276}$

Round and divide to estimate the quotient. Then divide to find the quotient.

5. $11\overline{)497}$ **6.** $56\overline{)3847}$ **7.** $7264 \div 34$ **8.** $\$476\,204 \div 68$

Exercises

Estimate each quotient.
Then divide to find the quotient.

1. $22\overline{)473}$ **2.** $43\overline{)346}$ **3.** $88\overline{)7063}$ **4.** $49\overline{)3509}$

5. $13\overline{)1486}$ **6.** $72\overline{)6445}$ **7.** $59\overline{)58\,723}$ **8.** $41\overline{)47\,380}$

9. $27\overline{)170\,052}$ **10.** $93\overline{)840\,260}$ **11.** $38\overline{)80\,397}$ **12.** $62\overline{)74\,021}$

13. $13\,760 \div 18$ **14.** $462\,462 \div 79$ **15.** $327\,277 \div 54$

16. $\$650\,349 \div 81$ **17.** $\$95\,552 \div 32$ **18.** $\$326\,300 \div 65$

For each exercise, estimate the quotient.
Then choose three of the numbers shown on the chart that could be the quotient.
Find each quotient, and score one point for each reasonable estimate.

19. $61\overline{)43\,676}$

20. $28\overline{)229\,740}$

21. $51\overline{)216\,036}$

22. $82\overline{)176\,218}$

23. $37\overline{)2701}$

24. $19\overline{)836}$

25. $69\overline{)55\,407}$

26. $91\overline{)39\,403}$

27. $76\overline{)6232}$

28. $42\overline{)294\,756}$

4280	7018	803	728
808	44	438	4236
71	1083	8208	72
716	435	7241	83
224	4207	203	2048
81	8205	7156	802
433	216	73	1438
724	43	8210	2149
42	82	9893	2108

Solve by estimating.

29. During an 11 d fair, \$1144 was collected at a game. About what was the average amount collected each day at the game?

30. A game was played 5336 times during the 58 h of the fair. About what was the average number of times the game was played each hour?

Practice

First, estimate the quotient without doing any work on paper. Then divide and compare the quotient with your estimate.

1. $20\overline{)4800}$	**2.** $69\overline{)3657}$	**3.** $51\overline{)5559}$	**4.** $24\overline{)69\,432}$
5. $62\overline{)28\,560}$	**6.** $31\overline{)309\,999}$	**7.** $10\overline{)67\,300}$	**8.** $86\overline{)657\,980}$
9. $55\overline{)387\,865}$	**10.** $16\overline{)144\,116}$	**11.** $74\overline{)46\,472}$	**12.** $29\overline{)26\,229}$

13. $70 680 ÷ 76	**14.** $65 065 ÷ 13	**15.** $2596 ÷ 44
16. $3013.50 ÷ 35	**17.** $321.08 ÷ 92	**18.** $5426.33 ÷ 67

Complete three exercises in each box. Write the result for the fourth exercise by using the pattern.

19. $30\overline{)8100}$	**20.** $40\overline{)11\,600}$	**21.** $70\overline{)21\,700}$	**22.** $90\overline{)29\,700}$
23. $47\overline{)37\,088}$	**24.** $56\overline{)38\,594}$	**25.** $72\overline{)42\,423}$	**26.** $48\overline{)23\,492}$
27. $78\overline{)78\,118}$	**28.** $85\overline{)170\,200}$	**29.** $94\overline{)282\,302}$	**30.** $84\overline{)336\,346}$

31. Make up a fifth exercise to fit each of the patterns above.

Study these division sentences.

$60 ÷ 10 = 6$	$400 ÷ 100 = 4$	$5\,000 ÷ 1000 = 5$
$720 ÷ 10 = 72$	$1\,100 ÷ 100 = 11$	$33\,000 ÷ 1000 = 33$
$6340 ÷ 10 = 634$	$82\,300 ÷ 100 = 823$	$601\,000 ÷ 1000 = 601$
$9100 ÷ 10 = 910$	$60\,000 ÷ 100 = 600$	$400\,000 ÷ 1000 = 400$

Give a rule that helps you find the quotient when

1. the divisor is 10.
2. the divisor is 100.
3. the divisor is 1000.

Make up some division exercises to test your rules.

try this

Solve.

32. There were 34 people on each roller coaster ride on a day when the turnstile showed 6222. How many times was the roller coaster used that day?

33. There were 73 rides on the Ferris wheel on a day when the turnstile showed 2336. If the same number of people rode each time, how many people were on each ride?

34. For each Wild Mouse ride, there were 4 people in each of the 7 cars. The turnstile showed 4368. How many times was the Wild Mouse ride used that day?

35. The 6 people in Hilda's family spent $104.16 altogether in 2 d at the fair. What was the average amount each person spent each day?

36. During the first week of the fair, 93 307 tickets were sold for a ride. The next week, 101 223 tickets were sold for that ride. The fair was open each day for 2 weeks. What was the average number of tickets sold each day for that ride?

37. This year, $118 860 was collected in 12 d for the rides. Last year, the average amount collected each day for the rides was $9236. How much more was the average amount collected each day for the rides this year than last year?

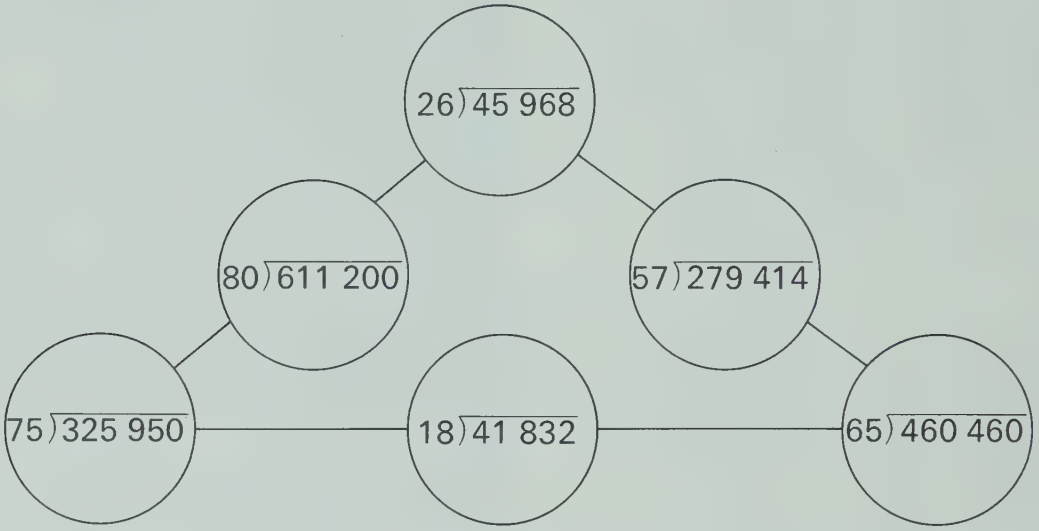
38. Julia's family has 22 films with 12 photographs each. They want to take the same number of photographs on each of their 11 d at the fair. How many should they take each day?

39. Each roll of dimes contains 50 dimes. 863 dimes from the rolls were used at a ride. How many whole rolls of dimes were used? How many dimes from another roll were used?

Practice

Copy these diagrams and divide as shown.
Then add the quotients along each line segment.
If your quotients are correct,
the sums in line will be equal.

1.



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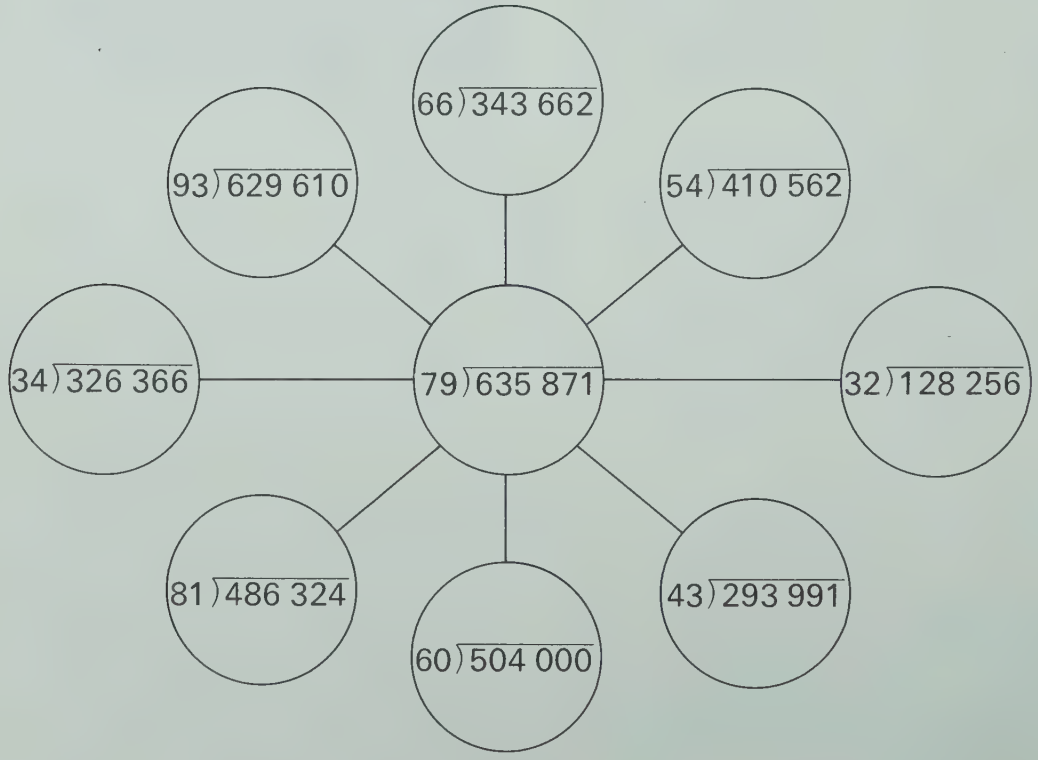


Computing Quickly

When you can compute in your head, you can find the result more quickly than you can when you use a calculator.

Choose a number from 1 to 10.

Add 4.

Multiply by 8.

Subtract 12.

Divide by 4.

Subtract 1.

Divide by 2.

Subtract the number you started with.

Your result is 2.

5

9

72

60

15

14

7

2

Yes!?!

Try each of these three times. What is special about your three results?

1. Use a number from 1 to 10. Add 5. Multiply by 3. Add 6. Divide by 3. Subtract 7.

2. Use a number from 1 to 10. Multiply by 20. Subtract 8. Divide by 4. Add 2. Divide by 5.

3. Think of a number from 10 to 20. Add 16. Multiply by 20. Subtract 340. Divide by 10. Add 2. Divide by twice the number you started with.

When the numbers become greater, you may need paper and pencil or a calculator to help you.

4. Use this year. Double it. Add 5. Multiply by 50. Add your age. Add 365. Subtract 615.

Try this with some other years too.

5. Use a number from 10 to 100. Add 57. Multiply by 57. Subtract 2166. Divide by 19. Subtract 57. Divide by 3.

Calculator

Solving Equations

The band and 9 other persons formed a marching unit in the parade. There were 65 persons in the unit. How many were in the band?

To find the value of n in n + 9 = 65, subtract 9 from 65.

This equation tells the story.

$$n + 9 = 65$$

number in the band | number of other marchers | number in the unit

There were 56 persons in the band.

This related equation helps solve the problem.

$$65 - 9 = n$$

This completes the solution.

$$65 - 9 = 56$$

Here are examples of related number sentences.

Addition and Subtraction		Multiplication and Division	
56 + 9 = 65	9 + 56 = 65	8 × 7 = 56	7 × 8 = 56
65 − 9 = 56	65 − 56 = 9	56 ÷ 8 = 7	56 ÷ 7 = 8

Copy each equation. Write a related equation. Then find the solution.

1. n − 4 = 7
2. 8 + n = 20
3. n ÷ 8 = 6
4. n × 7 = 56
5. n + 13 = 32
6. n ÷ 3 = 9
7. 9 × n = 81
8. n − 10 = 34

Write an equation for each of these. Then write a related equation. Find the solutions.

9. The band members marched in 8 rows with the same number in each row. There were 56 band members. How many were there in each row?

10. For the parade, all marching units were divided among 4 parade sections. That placed 7 units in each section. How many marching units were there?

11. From all the floats in the parade, 5 were chosen for prizes. There were 9 other floats. How many floats were in the parade?

PROBLEM SOLVING

Checking Up

Divide.

1. $6\overline{)378}$	**2.** $9\overline{)8323}$	**3.** $8\overline{)5672}$	**4.** $7\overline{)35\,566}$
5. $10\overline{)980}$	**6.** $30\overline{)2700}$	**7.** $60\overline{)45\,180}$	**8.** $90\overline{)403\,302}$
9. $22\overline{)699}$	**10.** $31\overline{)2198}$	**11.** $49\overline{)16\,908}$	**12.** $83\overline{)602\,005}$
13. $54\overline{)403}$	**14.** $76\overline{)8289}$	**15.** $93\overline{)45\,546}$	**16.** $67\overline{)549\,809}$
17. $72\overline{)650}$	**18.** $65\overline{)5855}$	**19.** $40\overline{)24\,340}$	**20.** $88\overline{)792\,529}$

21. 22 580 ÷ 35	**22.** 178 709 ÷ 28	**23.** 59 790 ÷ 61
24. 505 170 ÷ 73	**25.** 70 995 ÷ 87	**26.** 40 482 ÷ 52
27. \$210 800 ÷ 68	**28.** \$361 196 ÷ 44	**29.** \$765 000 ÷ 85
30. \$355.68 ÷ 57	**31.** \$718.41 ÷ 77	**32.** \$7399.56 ÷ 92
33. \$1027.25 ÷ 25	**34.** \$2440.64 ÷ 58	**35.** \$3957.11 ÷ 79

Solve.

36. In the parking lot at the fair, there are 708 cars in 12 equal rows. How many cars are in each row?

37. 4 girls had \$15.40 to share equally at the fair. How much would each receive?

38. During the fair, a photographer took 6000 photographs. Each film has 30 photographs. How many films were used?

39. 10 881 souvenirs were sold at a stand during a 9 d fair. What was the average number of souvenirs sold each day?

40. After the fair, Anita wanted to pack the remaining 3327 souvenirs in boxes. Each box held 36 souvenirs. How many whole boxes of souvenirs would she pack? How many souvenirs would she pack in another box?

41. Jack is arranging 918 exhibits on 27 tables at the fair. He wants to place the same number of exhibits on each table. How many exhibits should he place on each table?

42. There are 91 prizes for a contest. 3458 people entered the contest. On the average, how many people entered the contest for each prize?

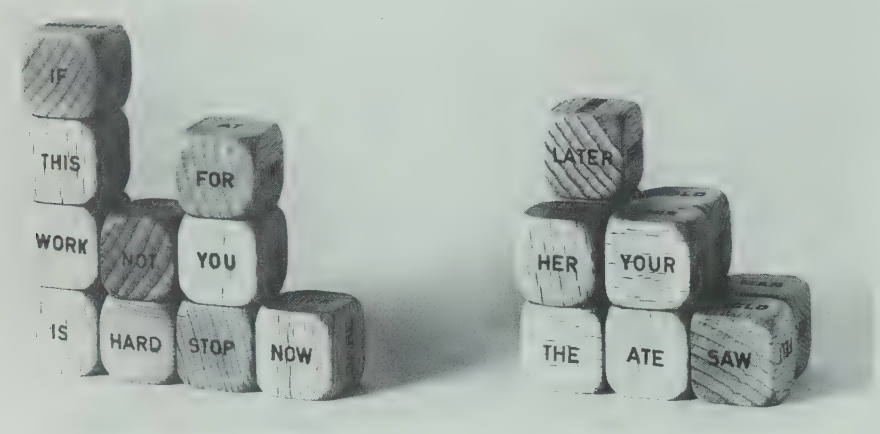
43. After the fair, Adam packed the remaining 126 prizes. He placed 18 prizes in each box. How many boxes did he use?

11 MEASUREMENT

Counting Cubes

Marina used word blocks to form a sentence.

How many blocks did she use? Count them.



10 blocks were used.

She had these blocks left over. How many are there? Count them.

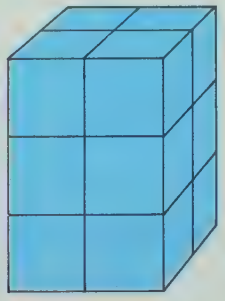
Think of how many there are in each layer.

11 blocks were left over.

Exercises

Count the cubes in each shape.

1.



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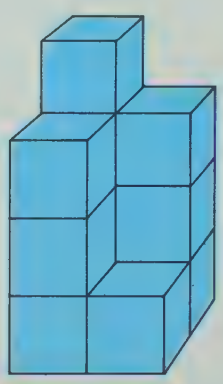
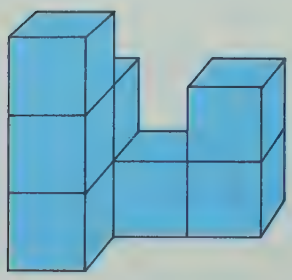


3.



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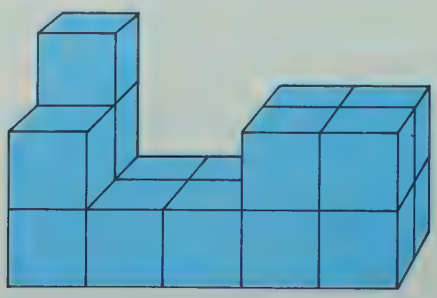
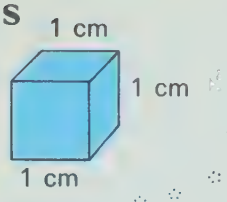


Volume in Cubic Centimetres

Each edge of this cube is 1 cm long.
The volume of the cube is 1 cm^3.

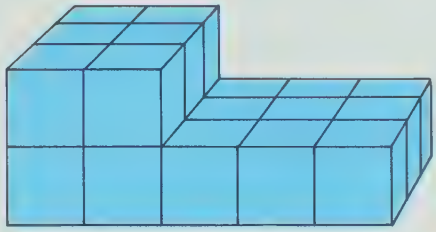


one cubic centimetre

You can find the volume of larger solids by counting centimetre cubes.

6 in the top layer

15 in the bottom layer



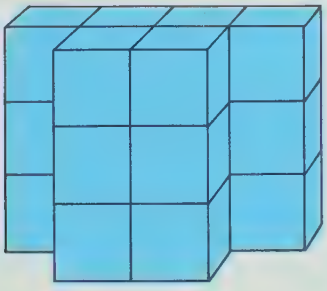
There are 21 centimetre cubes.

The volume of this solid is 21 cm^3.

Exercises

Find the volume in cubic centimetres.

1.



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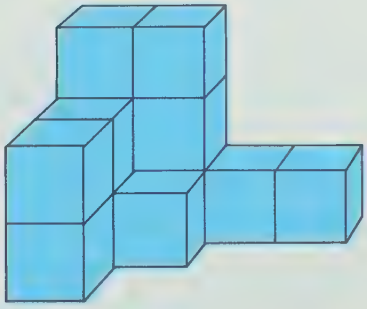
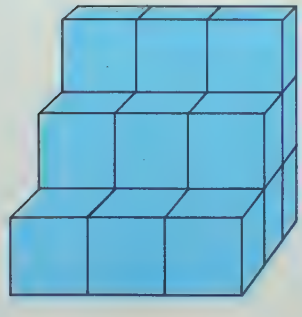
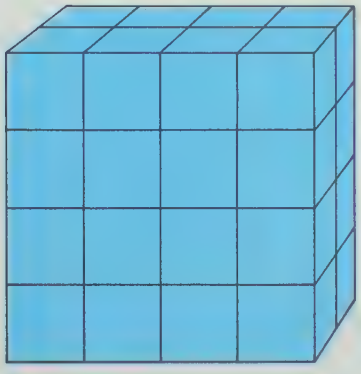


3.



4.

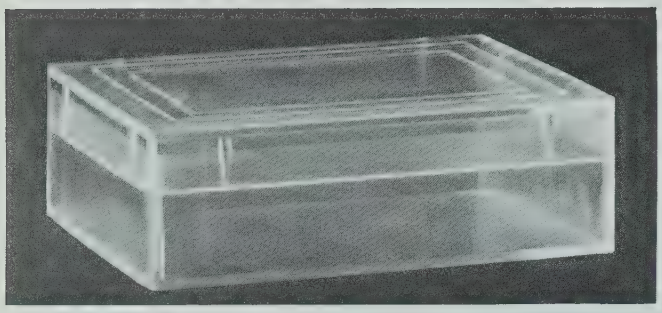


Volume of a Rectangular Prism

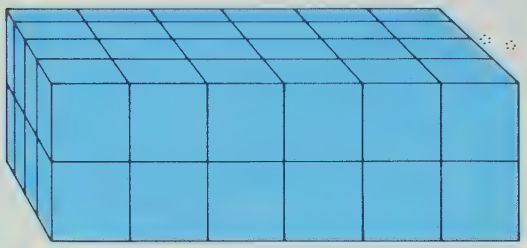
Multiplication can help to find the volume of a rectangular prism.

How much space does this box take?

Find the volume.



The box and this stack of centimetre cubes take the same amount of space.



6 along this edge

4 along this edge

2 along this edge

For the bottom layer,

$6 \times 4 = 24$

there are 24 cubes.

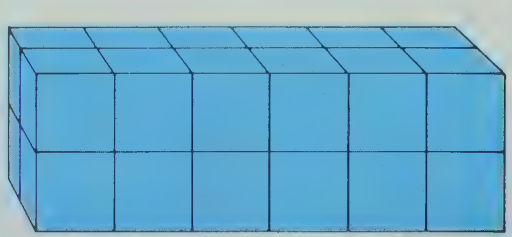
There are 2 layers

$2 \times 24 = 48$

or 48 cubes in all.

There are 48 centimetre cubes in this stack.
The volume of the box is $48\ cm^3$.

Tess made this rectangular prism with 24 cubes.



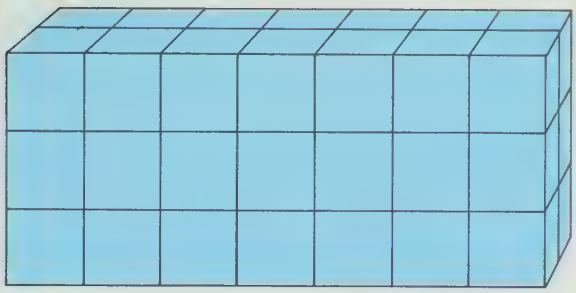
1. Show two other rectangular prisms that can be made with 24 cubes.

2. Show three rectangular prisms that can be made with 36 cubes.

try this

Working Together

For this solid, how many centimetre cubes are

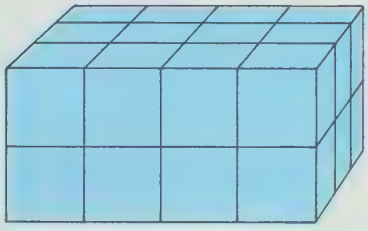


1. along one bottom edge?
2. along the other bottom edge?
3. in the bottom layer? Give the multiplication sentence.

For the same solid,

4. how many layers are there?
5. give the volume in cubic centimetres. Give the multiplication sentence.

For this solid,

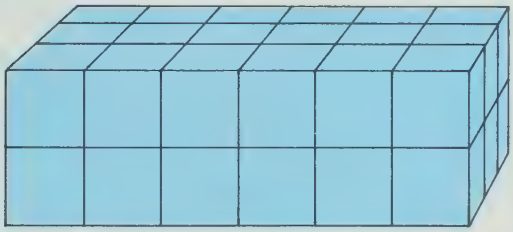


6. use multiplication to find the volume in cubic centimetres.

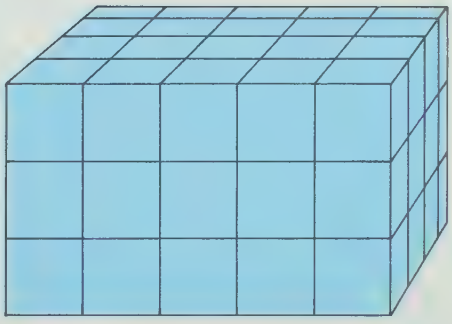
Exercises

For each solid, use multiplication to find the volume in cubic centimetres.

1.



2.



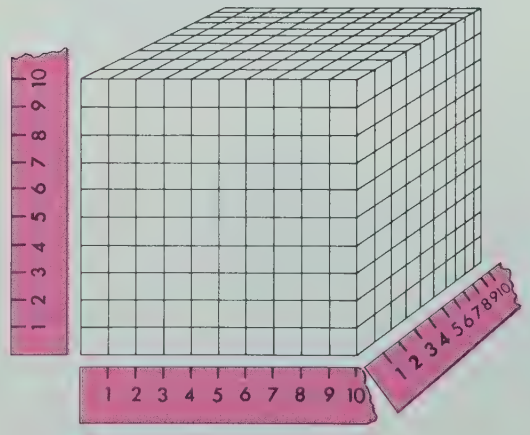
Complete this chart.

	Number of centimetre cubes along one bottom edge	along the other bottom edge	in the bottom layer	Number of layers	Volume in cubic centimetres
3.	6	2	?	4	?
4.	7	6	?	5	?
5.	9	7	?	8	?
6.	9	9	?	7	?
7.	10	10	?	10	?

Cubic Centimetres and Litres

1 L of soil will fill a box this size.

1000 centimetre cubes would fill a box the same size as the one above.



For the bottom layer,

$10 \times 10 = 100$

there are 100 cubes.

For 10 layers,

$10 \times 100 = 1000$

there are 1000 cubes.

1000 cm^3 will fill the box.

1 L and 1000 cm^3 take the same amount of space.

Working Together

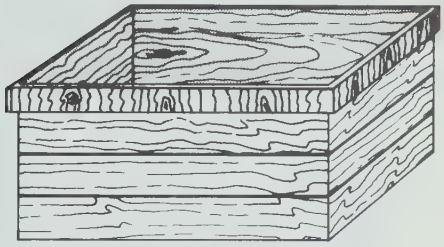
Complete.

1. 12 L take the same space as ▒▒ cm^3.

2. 35 000 cm^3 take the same space as ▒▒ L.

This planter could be filled with centimetre cubes so there would be

40 cubes along one bottom edge,
30 cubes along the other bottom edge,
and 20 layers of cubes.



3. For the bottom layer, $40 \times 30 =$ ▒▒ there are ▒▒ cm^3.

4. For 20 layers, $20 \times 1200 =$ ▒▒ there are ▒▒ cm^3.

5. 24 000 cm^3 = ▒▒ L
This planter can hold ▒▒ L of soil.

Exercises

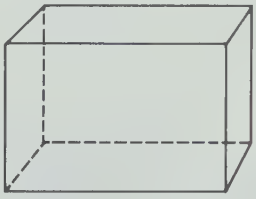
Complete these charts.

	cm^3	L
1.	8 000	?
2.	?	13
3.	?	19
4.	21 000	?
5.	35 000	?

		6.	7.	8.
Centimetre cubes in bottom layer		400	500	350
Number of layers		20	24	20
Amount of space	cm^3	?	?	?
	L	?	?	?

		9.	10.	11.	12.
Centimetre cubes along one bottom edge		30	40	25	55
Centimetre cubes along the other bottom edge		30	10	32	35
Centimetre cubes in bottom layer		?	?	?	?
Number of layers		20	15	25	40
Amount of space	cm^3	?	?	?	?
	L	?	?	?	?

Think of rectangular prisms



to help you with these, if needed.

Capacity in Litres and Millilitres

Each spray uses about 1 mL (millilitre) from these bottles.

The small bottle holds about 250 mL.

The large bottle holds about 500 mL when half full.

The large bottle holds about 1 L when full.

The large bottle can be used for about 1000 sprays.

$$1\ \text{L} = 1000\ \text{mL} \qquad 1\ \text{mL} = 0.001\ \text{L}$$

Working Together

Choose the best estimate for the capacity of each.

1.

1 mL	500 mL	1 L

2.

1 mL	500 mL	1 L

Complete.

3. 1 L = ▒ mL
2.5 L = 2.5 × ▒ mL
2.5 L = ▒ mL

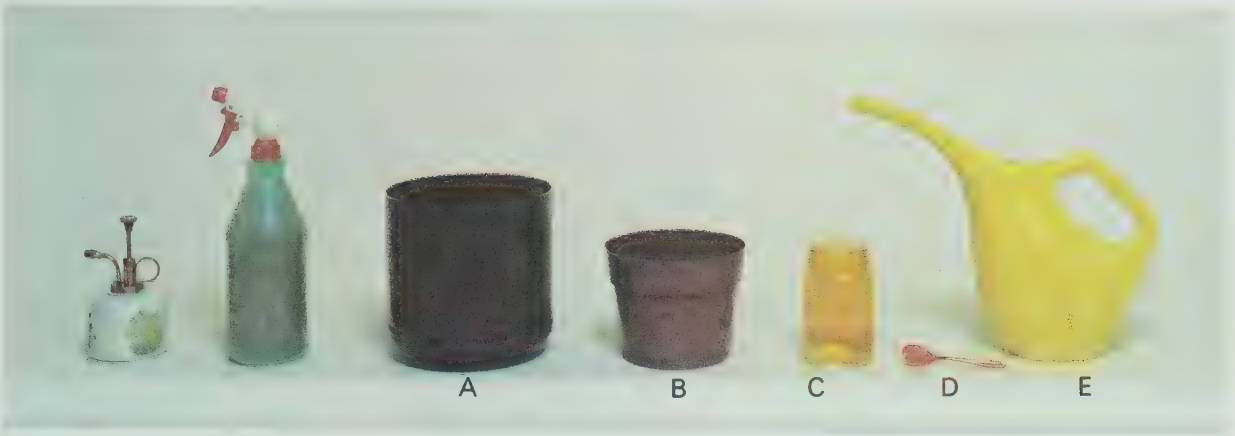
4. 8.25 L = ▒ mL

5. 0.47 L = ▒ mL

6. 1 mL = ▒ L
750 mL = 750 × ▒ L
750 mL = ▒ L

7. 1250 mL = ▒ L

8. 820 mL = ▒ L



Exercises

For the objects shown above,

1. choose the best estimate for the capacity of each.

1 mL	500 mL	1.5 L
2 L		3 L

Complete this chart.

Remember to use: 1 L = 1000 mL, 1 mL = 0.001 L

2.

mL	2000	?	?	6400	?	?	?	300
L	?	7	3.5	?	2.25	0.75	0.8	?

Mr. Kelly raises African violets. Each month he has to add 8 mL of plant food to each of the planters he uses. How many millilitres of plant food does he need

3. for one planter in one year?

4. for 25 planters in one year?

If a new bottle contains 500 mL of plant food,

5. how many years would the bottle last for one planter?

6. how many bottles would he need in one year for 25 planters?

KEEPING SHARP

Add.

1. 387 + 406

2. 2958 + 1627

3. 884 + 2496

4. 3857 + 7649

Subtract.

5. 364 − 291

6. 4438 − 2852

7. 2323 − 674

8. 7000 − 1796

Multiply.

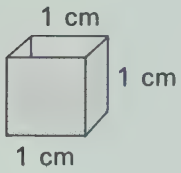
9. 9768 × 6

10. 6897 × 9

11. 7986 × 78

Cubic Centimetres and Millilitres

How many millilitres of water will fill a container whose volume is 1 cm^3?

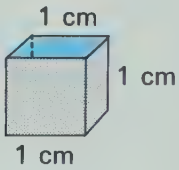


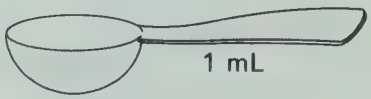
1 L and 1000 cm^3 take the same amount of space.
1 L and 1000 mL take the same amount of space.

1000 cm^3 and 1000 mL take the same amount of space.

That means 1 cm^3 and 1 mL also take the same amount of space.

1 mL of water will fill a container whose volume is 1 cm^3.





Working Together

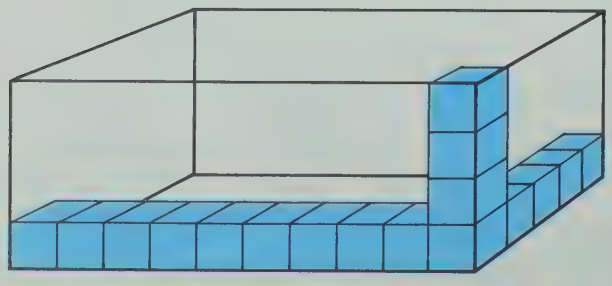
Complete.

1. 370 mL take the same space as ▒ cm^3.

2. 650 cm^3 take the same space as ▒ mL.

	3.	4.	5.	6.	7.	8.
cm^3	1	1000	1200	?	400	?
mL	1	?	?	2700	?	?
L	0.001	?	?	?	?	0.750

The picture shows how this rectangular prism could be filled with centimetre cubes.



9. How many centimetre cubes would be in one layer?

10. How many layers would there be?

11. How many cubic centimetres would fill the prism?

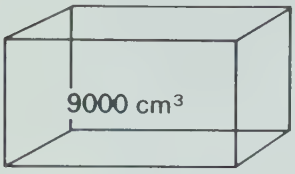
12. How many millilitres would fill the prism?

Exercises

For each tank, complete this sentence

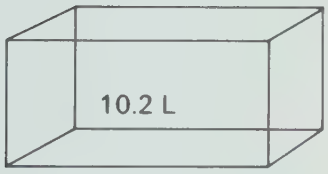
The tank will hold ▒ cm^3, ▒ mL, or ▒ L of water.

1.

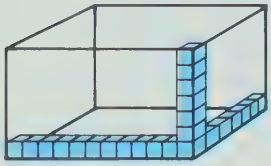


2.

3.

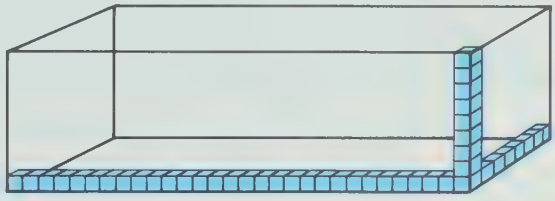


4.



Each small cube represents 1 cm^3.

5.



Complete this chart.

	6.	7.	8.	9.	10.	11.	12.
cm^3	1000	?	?	?	5240	?	?
mL	1000	1600	?	?	?	300	?
L	?	?	2.4	3.75	?	?	0.25

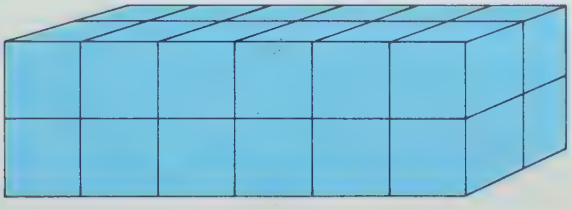
Write this sentence using "L".

13. The motorcycle has a 500 cm^3 engine.

Write this sentence using "cm^3".

14. The automobile has a 3.6 L engine.

Tess made a rectangular prism with 24 cubes. She glued the cubes together and then painted each side of the prism blue.



After being painted, how many of the cubes have blue

1. on 3 faces only?
2. on 2 faces only?
3. on 1 face only?
4. on 0 faces?

Answer the same questions for

5. other prisms that use 24 cubes.
7. a prism that uses 27 cubes.
6. a prism that uses 36 cubes.

PROBLEM SOLVING

Mass in Grams and Kilograms

The mass of the salt in a packet of salt is about 1 g (gram).

The mass of the salt in these two shakers is about 500 g.

The mass of the salt in this carton is about 1 kg.

The carton can be used for about 1000 packets of salt.

$$1 \text{ kg} = 1000 \text{ g} \qquad 1 \text{ g} = 0.001 \text{ kg}$$

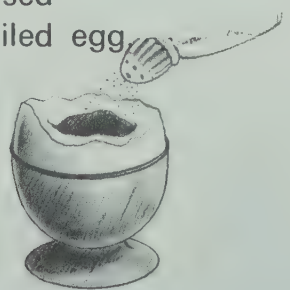
Working Together

Choose the best estimate for the mass of each.

1. The salt in the 4 shakers.

1 g	500 g	1 kg

2. The salt used on the boiled egg.



1 g	500 g	1 kg

Complete.

3. 1 kg = ▒ g
3.5 kg = 3.5 × ▒ g
3.5 kg = ▒ g

4. 6.45 kg = ▒ g

5. 0.28 kg = ▒ g

6. 1 g = ▒ kg
750 g = 750 × ▒ kg
750 g = ▒ kg

7. 2540 g = ▒ kg

8. 320 g = ▒ kg

Exercises

For the objects shown above,

1. choose the best estimate of the mass of each. →

1 g	500 g	1 kg
1.5 kg	3 kg	

Complete this chart. Remember to use: 1 kg = 1000 g, 1 g = 0.001 kg

2.

g	2000	?	?	1500	?	?	?	720
kg	?	3	4.7	?	3.62	0.47	0.05	?

Solve.

3. The mass of a loaf of bread is 675 g. There are 27 slices. About how many grams are there in one slice?

4. 45 g of peanut butter are used for each sandwich. Is there enough peanut butter in a 2 kg jar for 35 sandwiches?

KEEPING SHARP

Add.

1. 75.8 + 61.2

2. 2.69 + 2.88

3. 3.876 + 4.927

4. \$9.21 + \$0.95

Subtract.

5. 64.1 − 34.3

6. 7.44 − 5.56

7. 8.013 − 7.537

8. \$6.52 − \$4.68

Multiply.

9. 61.3 × 8

10. 7.9 × 46

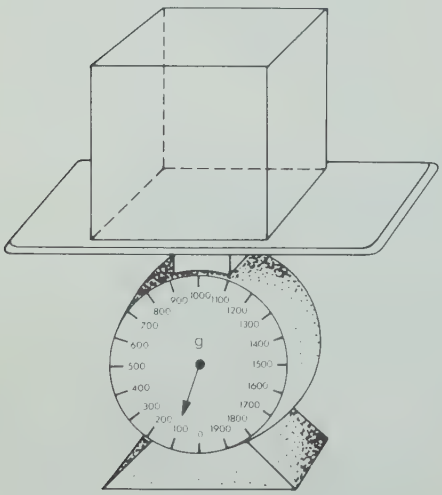
11. 73 × \$2.74

The Mass of Water

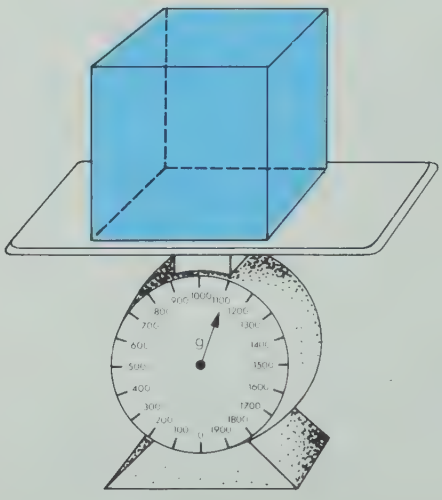
Larry knows that 1 L of water will fill this container.

He used a scale he found in the kitchen to get an idea of how heavy 1 L of water is.

For the empty container the scale showed 105 g.



For the full container the scale showed 1105 g.



The number of grams of water is the difference of 1105 and 105.

1105 − 105 = 1000

The mass of 1 L of water is 1000 g.

or 1 kg

The mass of 1000 mL of water is 1000 g.

The mass of 1 mL of water is 1 g.

Working Together

Complete.

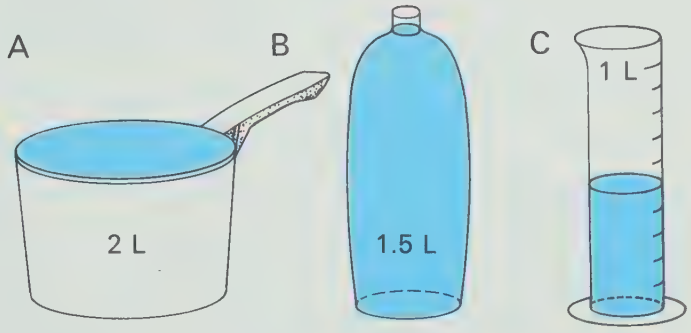
1. The mass of 5000 mL of water is ▒▒ g.
2. The mass of 4 L of water is ▒▒ kg.
3. The mass of ▒▒ mL of water is 810 g.
4. The mass of ▒▒ L of water is 1.6 kg.

	5.	6.	7.	8.	9.	10.
L	?	4	?	?	?	?
mL	5000	?	250	?	?	?
g	?	?	?	810	?	3160
kg	?	?	?	?	1.6	?

Exercises

For each container, give the amount of water

1. in millilitres.
2. in grams.
3. in kilograms.



Complete.

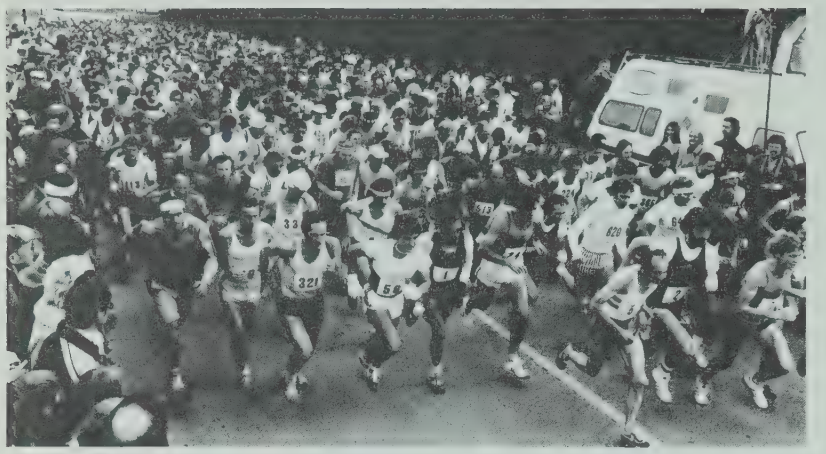
4. The mass of 640 mL of water is ▒▒ g.
5. The mass of 4.3 L of water is ▒▒ kg.
6. The mass of ▒▒ mL of water is 970 g.
7. The mass of ▒▒ L of water is 1.85 kg.

		8.	9.	10.	11.	12.
Volume of container	cm^3	4000	3250	?	?	?
Amount of water needed to fill it	mL	4000	?	?	?	?
	L	?	?	14.7	?	?
Mass of the water	kg	?	?	?	?	0.25
	g	?	?	?	1650	?

The 24-Hour Clock

The 24-hour clock shows
when the marathon race began.

ten-thirty
in the morning



The winning runner took
2 h, 17 min, and 43 s.
At what time did he
cross the finish line?

Add. 10:30:00
02:17:43
12:47:43

47 min
and 43 s
after noon

Working Together

This 24-hour clock shows when the last runner finished in the afternoon.

1. Look at the hour hand.
   What hour has just passed?

2. Look at the minute hand.
   What minute has just passed?
3. Look at the second hand.
   How many seconds are shown?
4. Write the time. Show hours,
   then minutes, then seconds.
5. How long did it take the
   last runner to finish?

Is the time shown below
before noon or after noon?
How can you tell?

6. 19:35:16
7. 04:42:18

What time is it
when the clock hands are

8. like this
   before noon?
9. like this
   after noon?

The winning runner crossed the finish line 2 h, 17 min, and 43 s later.

Exercises

Write the time shown on the clock

1. when it is time for dinner.

2. when it is time for school.

Choose the better time for

3. delivering the morning paper.

06:10:45 or 18:10:45

4. eating an after-school snack.

03:50:30 or 15:50:30

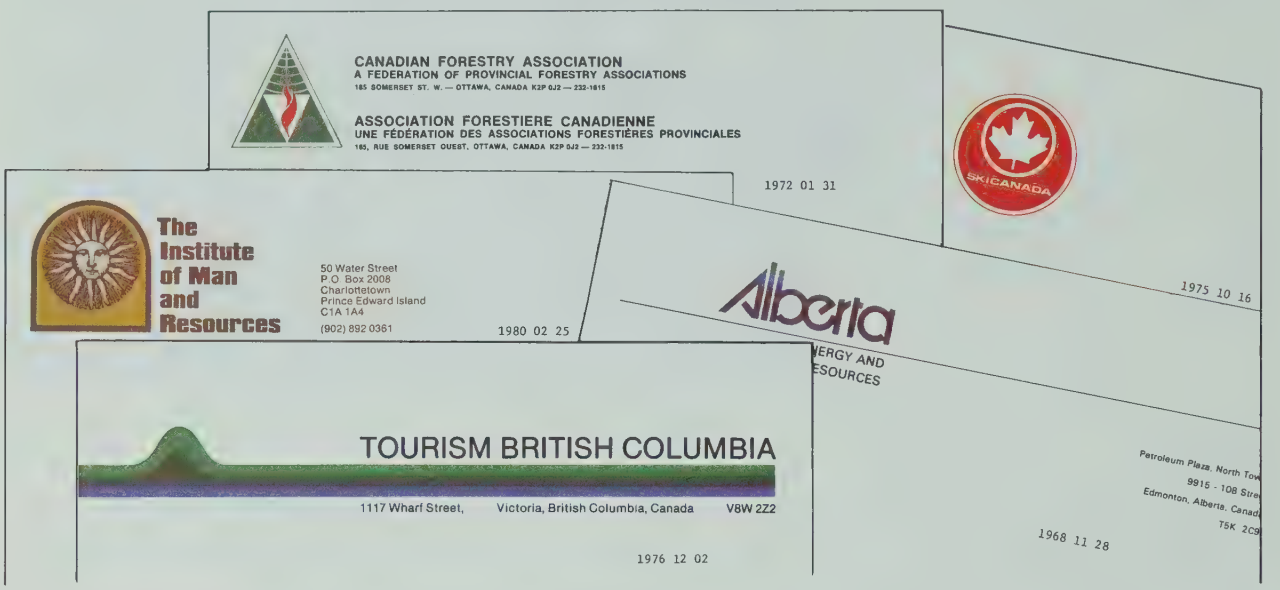
Complete this chart.

	Runner	Starts	Finishes	Time taken
5.	Ed	10:30:12	12:57:14	? h ? min ? s
6.	Nancy	10:30:12	?	3 h 6 min 9 s
7.	Ivan	10:30:36	?	3 h 15 min 4 s
8.	Dino	10:31:00	14:50:41	? h ? min ? s
9.	Anna	10:31:24	13:40:53	? h ? min ? s

Numeric Dating

The SKICANADA letter was written on October 16, 1975.

The first four digits show the year, the next two show one of the 12 months, and the last two show the day of that month.



Working Together

Tell

1. which number names each month.

For the letter from The Institute of Man and Resources,

2. what year is shown?
3. what month is shown?
4. what day of the month is shown?

Give the month, day, and year.

5. 1973 01 08
6. 1976 08 01

Give the date of your birth

7. in two ways.

Exercises

Give the month, day, and year

1. for the Canadian Forestry letter.
2. for the Alberta letter.
3. for the British Columbia letter.

Using 8 digits, what date would you put on a letter

4. on May 5, 1982?
5. on August 8, 1908?
6. on July 11, 1867?
7. on the day after Dec. 31, 1999?

Write the months of the year in the order shown. Tell why they are listed in this order.

*8. 4, 8, 12, 2, 1, 7, 6, 3, 5, 11, 10, 9

Finding Patterns

Draw the first four pictures for each chart. Count and record the results. Then complete the chart by using the number pattern.

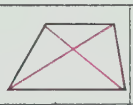
1. Cutting pizza

			?	?		
Number of cuts	1	2	3	4	9	12
Number of pieces	2	4	?	?	?	?

2. Diagonals from one vertex of a polygon

			?	?		
Number of sides	3	4	5	6	8	11
Number of diagonals	0	?	?	?	?	?

3. Diagonals in a polygon

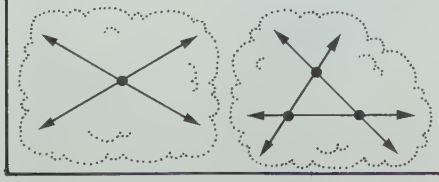
			?	?			
Number of sides	3	4	5	6	7	12	20
Number of diagonals	0	2	?	?	?	?	?

4. Triangular numbers

				?			
Number of rows	1	2	3	4	5	8	13
Number of dots	1	3	?	?	?	?	?

How many points of intersection can there be for

5. 2 lines? 3 lines? 4 lines? 5 lines?

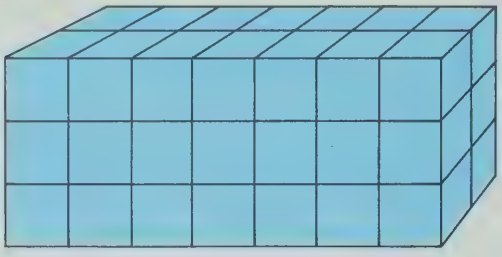


PROBLEM SOLVING

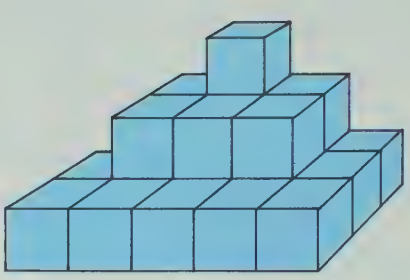
Checking Up

Each small cube represents a cubic centimetre.
Give each volume in cubic centimetres.

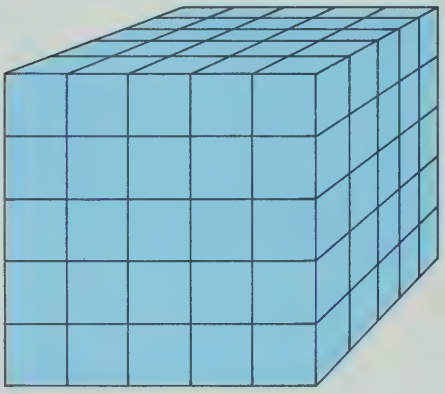
1.



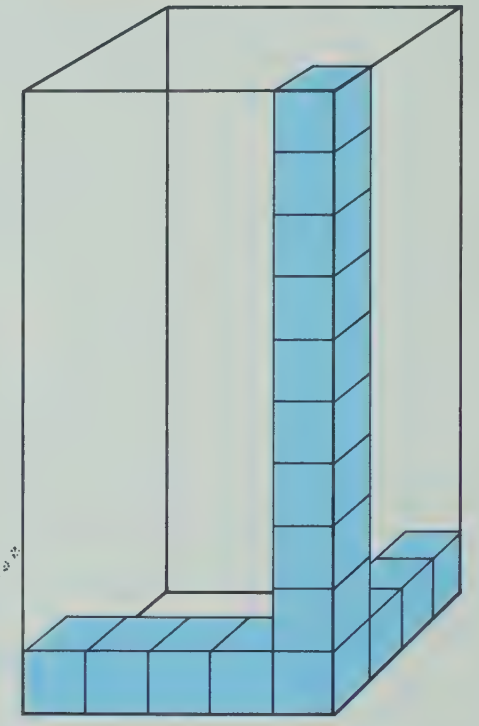
2.



3.



4.



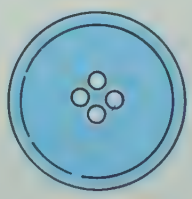
Find how many centimetre cubes will fill this rectangular prism.

Choose the best estimate for

5. the capacity.

1 mL	500 mL	1 L

6. the mass.



1 g	500 g	1 kg

Complete.

7. 4000 mL = ▒ L

8. 6.7 L = ▒ mL

9. 450 mL = ▒ L

10. 3000 g = ▒ kg

11. 1400 g = ▒ kg

12. 0.35 kg = ▒ g

13. 480 cm^3 take the same space as ▒ mL.

14. 675 mL take the same space as ▒ cm^3.

15. 12 000 cm^3 take the same space as ▒ L.

16. 8.45 L take the same space as ▒ cm^3.

17. The mass of 250 mL of water is ▒ g.

18. The mass of 3.2 L of water is ▒ kg.

19. The mass of ▒ L of water is 0.8 kg.

20. The mass of ▒ mL of water is 2500 g.

21. The fish tank holds 35 000 cm^3. ▒ mL of water will fill the tank.

22. ▒ L of water will fill the tank.

23. The tank can hold ▒ kg of water.

24. The tank can hold ▒ g of water.

For this 24-hour clock,

25. write the time shown if it is before noon.

26. write the time shown if it is after noon.

27. Write the time it would be 3 h 14 min 6 s earlier in the afternoon.

28. Write the time it would be 3 h 14 min 6 s later in the morning.

If the time shown is before noon, write the time for

29. 6 h 20 min 9 s earlier.

30. 6 h 20 min 9 s later.

Complete this chart to show each date two ways.

31.	**32.**	**33.**	**34.**
Nov. 6, 1959	?	?	June 6, 2066
?	1931 04 08	1850 12 11	?

Checking Skills

Add.

1. 425 + 343

2. 26.4 + 70.2

3. $2.51 + 3.37

4. 364 + 174

5. 21.3 + 19.5

6. $12.62 + 13.95

7. 343 + 389

8. 4.64 + 2.36

9. $28.73 + 49.51

10. 967 + 584

11. 29.7 + 88.3

12. $16.58 + 9.72

13. 9685 + 7286

14. 24.559 + 7.549

15. 124 + 2037 + 69

16. 195.6 + 240.9 + 38.2

17. 10.52 + 0.06 + 12.98 + 1.49

18. $403.19 + 4.98 + 68.73 + 135.27

19. 325 + 61

20. 6.33 + 1.26

21. 764 + 2165

22. 41.3 + 4.7

23. 5738 + 2846

24. 2.694 + 2.531

25. 1271 + 6968

26. 28.87 + 15.79

27. 40 558 + 49 894

28. 52.794 + 7.368

29. $126.48 + $84.93

30. 405 + 3839 + 63

31. 64.8 + 9.3 + 126.9

32. $78.49 + $104.98 + $28.89

33. 16.97 + 1.24 + 0.55 + 29.76

Subtract.

1. 734 − 321

2. 95.6 − 42.4

3. $6.44 − 3.41

4. 850 − 24

5. 34.7 − 5.0

6. $11.75 − 5.13

7. 525 − 138

8. 17.37 − 9.65

9. $24.93 − 15.37

10. 7317 − 5428

11. 625.0 − 358.3

12. $58.14 − 29.39

13. 2704 − 1237

14. 460.3 − 171.5

15. $25.02 − 6.73

16. 3006 − 1687

17. 500.2 − 72.5

18. $73.00 − 16.28

19. 67 323 − 8 394

20. 8362.3 − 1394.9

21. 42.60 − 3.71

22. $514.95 − 356.96

23. 50 030 − 1 641

24. 42.600 − 3.715

25. 858 − 215

26. 8:37 − 6.34

27. 3918 − 2381

28. $6.67 − $4.02

29. 6315 − 5872

30. 1.358 − 0.684

31. 7833 − 3894

32. $93.11 − $7.19

33. 600 − 409

34. 700.1 − 248.7

35. $62.00 − $13.56

36. 50 000 − 35 676

37. 42.000 − 19.123

38. $60 000 − $43 295

Multiply.

1. 36 × 2

2. 8.3 × 6

3. 27¢ × 4

4. 746 × 3

5. 39.7 × 9

6. $8.55 × 7

7. 4567 × 6

8. 3.782 × 8

9. $19.93 × 5

10. 62 × 73

11. 0.37 × 41

12. 46¢ × 59

13. 323 × 68

14. 13.4 × 95

15. $6.81 × 39

16. 7454 × 27

17. 9.18 × 24

18. $22.53 × 75

19. 535 × 834

20. 84.9 × 192

21. $8.84 × 679

22. 3735 × 715

23. 2.673 × 926

24. $19.72 × 483

25. 18 545 × 8

26. 266.79 × 5

27. 42.835 × 6

28. $137.97 × 9

29. 0.9 × 0.2

30. 0.4 × 0.6

31. 0.2 × 0.4

32. 6.5 × 0.6

33. 1.7 × 0.3

34. 9.4 × 0.8

35. 5.8 × 4.7

36. 8.6 × 2.5

37. 8.1 × 8.3

Solve.

1. A record album costs $5.95. A "single" costs $1.29. How much would both cost?

2. A cassette tape recorder costs $39.98. Batteries cost $4.87. A microphone costs $4.95. Tape cassettes cost $10.76. An earphone costs 98¢. How much does the complete set cost?

3. A color television set costs $289.39. A black and white set costs $99.95. How much more does the color set cost?

4. How much change is there from a twenty-dollar bill when $9.98 is paid for a record album?

5. Each cassette has 45 min of recording time. How many minutes are on 8 cassettes?

6. Each reel of recording tape costs $5.49. How much would 6 reels cost?

7. A cassette has 86.56 m of tape. How many metres would there be on 12 cassettes? How much more than 1 km is this?

8. Each tape cassette costs $2.69. How much would 24 cassettes cost?

9. Each tape cassette costs $2.69. For 3 cassettes, how much change would there be from a ten-dollar bill?

10. 1675 record albums that sold for $5.95 each were put on sale for $4.79 each. How much less would they sell for in all?

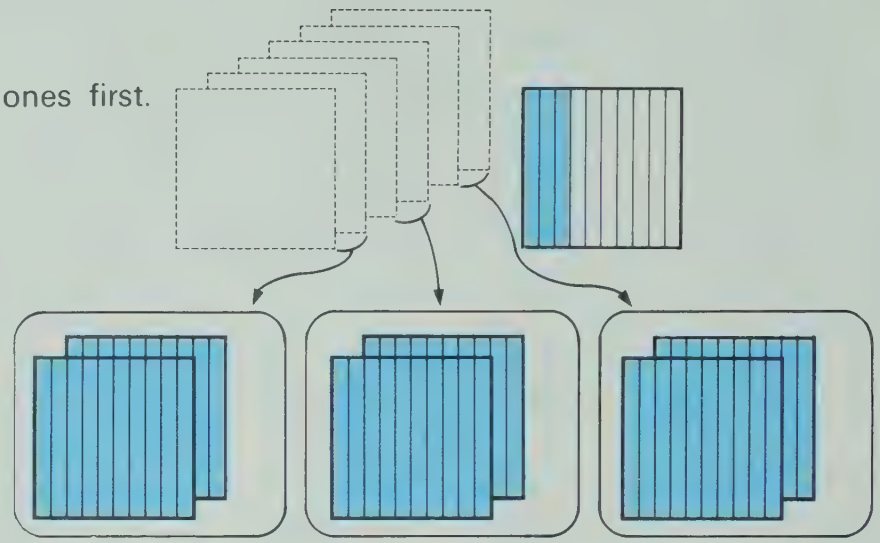
12 DIVIDING DECIMALS

Sharing Ones and Tenths

Divide 6.3 by 3.

For $3\overline{)6.3}$, share the 6 ones first.

Think $3 \times 2 = 6$



Write

$$\begin{array}{r} \text{ones}\ \ \text{tenths} \\ 2 \\ 3\overline{)6.3} \\ 6 \\ \hline 0 \end{array}$$

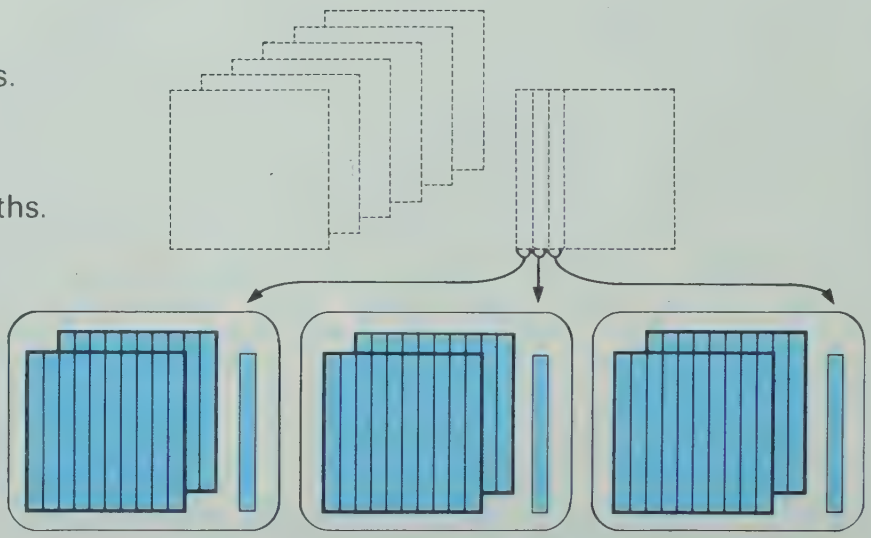
There are 0 ones left, but
there are still 3 tenths to share.

$$\begin{array}{r} 2 \\ 3\overline{)6.3} \\ 6 \downarrow \\ \hline 0\ 3 \end{array}$$

Then share the 3 tenths.

$3 \times 1 = 3$

Use 3×1 tenth $= 3$ tenths.



Write

$$\begin{array}{r} 2.1 \\ 3\overline{)6.3} \\ 6 \\ \hline 0\ 3 \\ 3 \\ \hline 0 \end{array}$$

Place the decimal point in the quotient above the decimal point in the dividend.

When 6.3 is divided by 3, the quotient is 2.1.

Working Together

Complete.

1. Share 8 ones between 2 and each gets ▒ ones.
2. Share 6 tenths between 2 and each gets ▒ tenths.
3. For $2\overline{)8.6}$, first share ▒ ones, then share ▒ tenths. Each will get ▒ ones and ▒ tenths, or ▒.

Divide. Remember to place the decimal point in the quotient.

4. $2\overline{)8.6}$ **5.** $3\overline{)6.9}$ **6.** $4\overline{)8.4}$

Exercises

Divide.

1. $4\overline{)4.8}$ **2.** $2\overline{)2.8}$ **3.** $3\overline{)3.6}$

4. $2\overline{)8.2}$ **5.** $3\overline{)6.6}$ **6.** $2\overline{)4.8}$

7. $5\overline{)5.5}$ **8.** $2\overline{)8.8}$ **9.** $3\overline{)9.6}$

10. $2\overline{)6.4}$ **11.** $3\overline{)9.3}$ **12.** $2\overline{)6.2}$

13. $4\overline{)8.8}$ **14.** $2\overline{)2.6}$ **15.** $2\overline{)4.6}$

16. $2\overline{)2.4}$ **17.** $3\overline{)9.9}$ **18.** $2\overline{)6.8}$

Solve.

19. It took Kelly 6.6 s to run across the room and back. If it took the same time to run each way, how long did it take him to run one way?

20. The temperature went up 3.9 °C in 3 h. If it went up the same amount in each hour, how much did it go up in the first hour?

Glass lenses are ground in optical laboratories.

1. The glass is 9.03 mm thick. It must be ground until it is 8.25 mm thick for the lens of a magnifying glass. How much must be ground from the glass?
2. For a thickness of 8.25 mm, 2.89 mm had to be ground from the glass in all. How thick was the glass before grinding?
3. The magnifying glass can magnify 3.2 times. How wide will an object that is 1.3 cm wide appear in the magnifying glass?

4. A magnifying glass costs $8.98. Pam and her 6 friends each want one. Every second Saturday they earn $15 mowing lawns. From the first day they mow, how long will it take them to earn enough for the magnifying glasses?

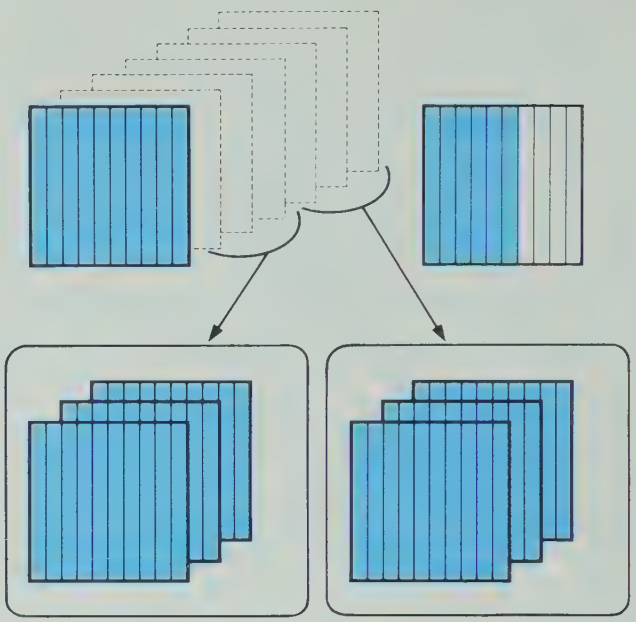
PROBLEM SOLVING

Dividing Ones and Tenths with Regrouping

Divide 7.6 by 2.

For $2\overline{)7.6}$, divide the 7 ones first.

$2 \times 3 = 6$
$2 \times 4 = 8$ . . . too great!



Use $2 \times 3 = 6$. Write

$$\begin{array}{r} 3 \\ 2\overline{)7.6} \\ 6 \\ \hline 1 \end{array}$$

Think of the 1 one 6 tenths that remain as 16 tenths.

$$\begin{array}{r} 3 \\ 2\overline{)7.6} \\ 6 \\ \hline 16 \end{array}$$

Then divide the 16 tenths.

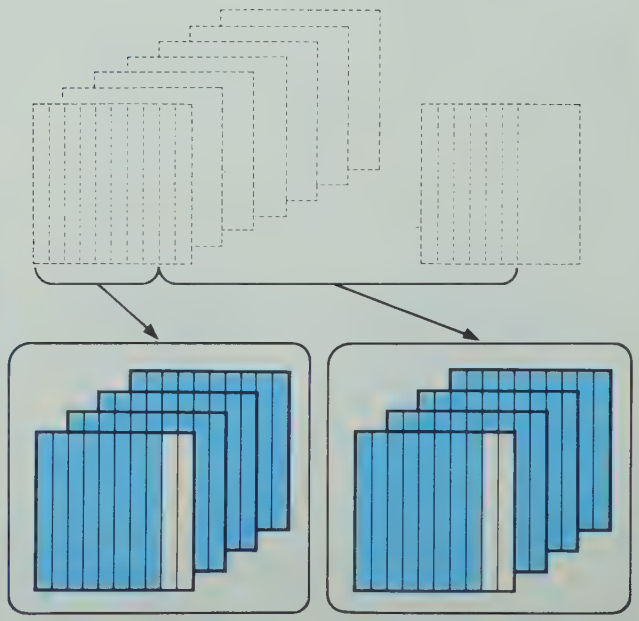
$2 \times 8 = 16$

Use 2×8 tenths $= 16$ tenths.

Place the decimal point in the quotient above the decimal point in the dividend.

Write

$$\begin{array}{r} 3.8 \\ 2\overline{)7.6} \\ 6 \\ \hline 16 \\ 16 \\ \hline 0 \end{array}$$



When 7.6 is divided by 2, the quotient is 3.8.

Working Together

Complete.

1. 1 one and 2 tenths = ▒ tenths

2. 3 ones and 5 tenths = ▒ tenths

Give the first multiplication fact you can use to find the quotient.

Example: For $4\overline{)9.6}$, use $4 \times 2 = 8$.

3. $2\overline{)7.2}$ **4.** $5\overline{)23.5}$ **5.** $3\overline{)12.6}$

Complete.

6.
$$\begin{array}{r} 2.\blacksquare \\ 4\overline{)9.6} \\ \underline{8} \\ 1\,6 \\ \underline{\blacksquare} \\ \blacksquare \end{array}$$

7.
$$\begin{array}{r} 4.\blacksquare \\ 5\overline{)23.5} \\ \underline{20} \\ \blacksquare \\ \underline{\blacksquare} \\ \blacksquare \end{array}$$

Divide. Remember to place the decimal point in the quotient.

8. $2\overline{)7.2}$ **9.** $4\overline{)22.4}$ **10.** $3\overline{)12.6}$

Exercises

Divide.

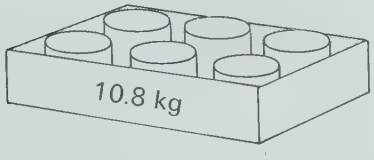
1. $4\overline{)5.2}$ **2.** $3\overline{)8.4}$ **3.** $2\overline{)9.6}$ **4.** $5\overline{)11.5}$ **5.** $6\overline{)8.4}$

6. $7\overline{)16.8}$ **7.** $8\overline{)9.6}$ **8.** $9\overline{)15.3}$ **9.** $4\overline{)16.8}$ **10.** $6\overline{)21.6}$

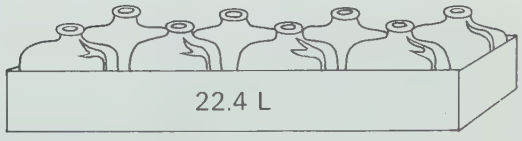
11. $2\overline{)11.2}$ **12.** $5\overline{)6.5}$ **13.** $3\overline{)11.1}$ **14.** $7\overline{)40.6}$ **15.** $2\overline{)8.4}$

Solve.

16. How heavy is each can?



17. How much does each jug hold?



18. What is the average mass of each melon?

19. What is the average mass of each cabbage?

Dividing Hundredths and Thousandths

Holly, Kris, and Ian earned $8.64 delivering coupons. They shared the money equally. How much did each earn?

Divide 8.64 by 3.

For $3\overline{)8.64}$, divide the 8 ones first.

$3 \times 2 = 6$
$3 \times 3 = 9$ . . . too great!

Use $3 \times 2 = 6$.

Write

$$\begin{array}{r} 2 \\ 3\overline{)8.64} \\ \underline{6} \\ 2 \end{array}$$

Think of the 2 ones 6 tenths that remain as 26 tenths.

$$\begin{array}{r} 2 \\ 3\overline{)8.64} \\ \underline{6}\downarrow \\ 26 \end{array}$$

Then divide the 26 tenths.

$3 \times 8 = 24$
$3 \times 9 = 27$ . . . too great!

Use 3×8 tenths $= 24$ tenths.

Write

$$\begin{array}{r} 2.8 \\ 3\overline{)8.64} \\ \underline{6} \\ 26 \\ \underline{24} \\ 2 \end{array}$$

Think of the 2 tenths 4 hundredths that remain as 24 hundredths.

$$\begin{array}{r} 2.8 \\ 3\overline{)8.64} \\ \underline{6} \\ 26 \\ \underline{24}\downarrow \\ 24 \end{array}$$

Then divide the 24 hundredths.

$3 \times 8 = 24$

Use 3×8 hundredths $= 24$ hundredths.

Write

$$\begin{array}{r} 2.88 \\ 3\overline{)8.64} \\ \underline{6} \\ 26 \\ \underline{24} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Take another look:

$$\begin{array}{r} \$2.88 \\ 3\overline{)\$8.64} \\ \underline{6} \\ 26 \\ \underline{24} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Holly, Kris, and Ian each earned $2.88.

Working Together

Complete.

1.
$$\begin{array}{r} 1.5\blacksquare \\ 5\overline{)7.95} \\ 5 \\ \hline 2\,9 \\ 2\,5 \\ \hline 45 \\ \blacksquare\blacksquare \\ \hline \blacksquare \end{array}$$

2.
$$\begin{array}{r} 3.\blacksquare\blacksquare \\ 6\overline{)20.10} \\ 18 \\ \hline \blacksquare \\ \blacksquare \\ \hline \blacksquare\blacksquare \\ \blacksquare \\ \hline \blacksquare \end{array}$$

3.
$$\begin{array}{r} 1.\blacksquare\blacksquare\blacksquare \\ 4\overline{)5.612} \\ 4 \\ \hline \blacksquare \\ \blacksquare \\ \hline \blacksquare\blacksquare\blacksquare \\ \blacksquare \\ \hline \blacksquare \end{array}$$

Divide.

4. $3\overline{)7.62}$

5. $5\overline{)9.765}$

6. $2\overline{)\$11.56}$

7. $4\overline{)4.248}$

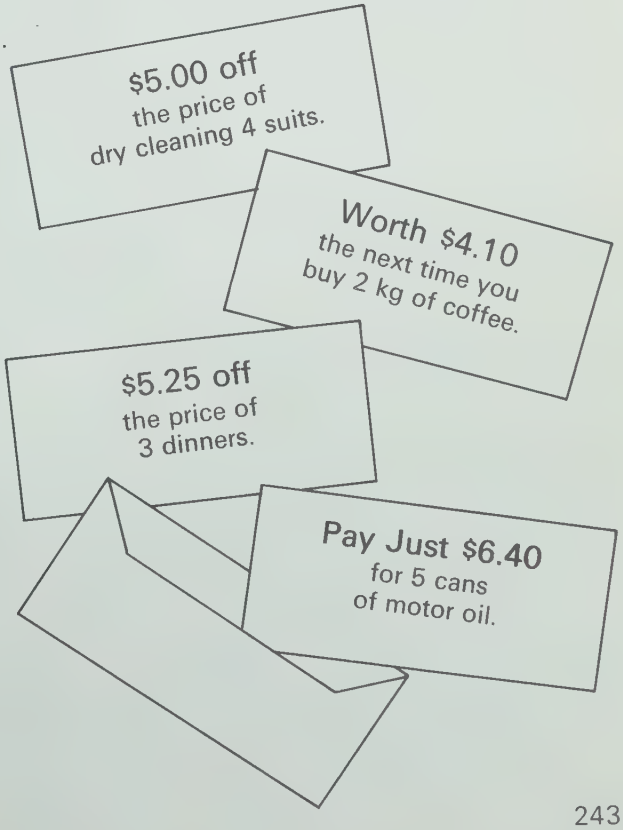
8. $6\overline{)18.036}$

Exercises

Divide.

1. $4\overline{)5.08}$	**2.** $2\overline{)9.38}$	**3.** $3\overline{)11.97}$	**4.** $5\overline{)8.690}$	**5.** $7\overline{)\$7.84}$
6. $8\overline{)8.64}$	**7.** $4\overline{)6.32}$	**8.** $9\overline{)26.01}$	**9.** $3\overline{)5.409}$	**10.** $5\overline{)\$9.35}$
11. $2\overline{)5.70}$	**12.** $7\overline{)8.54}$	**13.** $5\overline{)20.005}$	**14.** $7\overline{)9.996}$	**15.** $8\overline{)\$16.32}$
16. $3\overline{)8.85}$	**17.** $3\overline{)7.77}$	**18.** $9\overline{)43.434}$	**19.** $6\overline{)6.012}$	**20.** $5\overline{)\$24.55}$

Solve. Use these coupons to help you.



21. How much less does it cost to clean each suit with the coupon?

22. How much less does 1 kg of coffee cost with the coupon?

23. How much less does each dinner cost with the coupon?

24. How much does each can of oil cost with the coupon?

25. The students were paid $8.64 for delivering 6 bundles of coupons. How much did they earn for each bundle?

*__26.__ The 3 students shared the money equally. How much did *each* student earn for *each* bundle?

Practice

For each square, divide the perimeter by 4 to find the length of each side.

1.

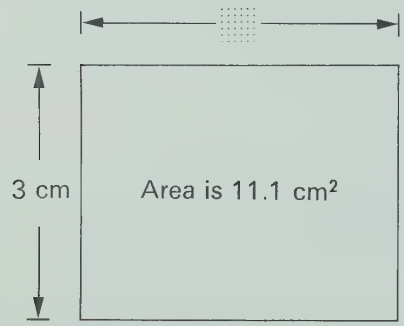
2.

3. The perimeter of a square is 15.88 m.

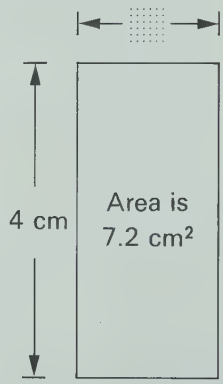
4. The perimeter of a square is 5.52 km.

For each rectangle, divide the area by the length of one side to find the length of the other side.

5.



6.



	One Side	Area
7.	2 cm	15.2 cm^2
8.	9 cm	31.5 cm^2
9.	5 m	9.0 m^2
10.	8 m	22.08 m^2
11.	3 km	7.5 km^2
12.	2 km	7.36 km^2

Divide. Multiply to check.

13. $4\overline{)8.4}$ **14.** $3\overline{)6.63}$

15. $5\overline{)6.5}$ **16.** $4\overline{)4.08}$

17. $2\overline{)17.8}$ **18.** $3\overline{)7.272}$

19. $7\overline{)12.6}$ **20.** $2\overline{)12.58}$

21. $6\overline{)24.174}$ **22.** $5\overline{)5.015}$

Divide to find the other number.

	Product of two numbers	One of the numbers
23.	8.45	5
24.	20.4	3
25.	9.576	8
26.	18.97	7

Quotients Less Than 1

Divide 5.25 by 7.

For $7\overline{)5.25}$, divide the 5 ones.

$7 \times 0 = 0$
$7 \times 1 = 7$ . . . too great!

Use $7 \times 0 = 0$. Write $\begin{array}{r} 0 \\ 7\overline{)5.25} \end{array}$

When the divisor → $7\overline{)5.25}$ ← the dividend, is greater than the dividend, the quotient is less than 1. The first digit in the quotient is 0.

Think of the 5 ones 2 tenths as 52 tenths.

Then divide the 52 tenths. Write

$7 \times 7 = 49$
$7 \times 8 = 56$ . . . too great!

Use 7×7 tenths $= 49$ tenths.

$\begin{array}{r} 0.7 \\ 7\overline{)5.25} \\ 49 \\ \hline 3 \end{array}$

Think of the 3 tenths 5 hundredths that remain as 35 hundredths.

Then divide the 35 hundredths. Write

$7 \times 5 = 35$

Use 7×5 hundredths $= 35$ hundredths.

$\begin{array}{r} 0.75 \\ 7\overline{)5.25} \\ 49 \\ \hline 35 \\ 35 \\ \hline 0 \end{array}$

When 5.25 is divided by 7, the quotient is 0.75.

Working Together

Give the first digit in each quotient.

1. $3\overline{)1.5}$ **2.** $7\overline{)3.78}$ **3.** $4\overline{)11.2}$

Divide.

4. $6\overline{)2.4}$ **5.** $2\overline{)1.616}$ **6.** $8\overline{)\$2.00}$

Exercises

Use the first quotient to help you write the other quotients.

1. $\begin{array}{r} 752 \\ 3\overline{)2256} \end{array}$ $3\overline{)22.56}$ $3\overline{)2.256}$

2. $8\overline{)1872}$ $8\overline{)18.72}$ $8\overline{)1.872}$

Divide.

3. $5\overline{)1.25}$ **4.** $2\overline{)0.76}$ **5.** $7\overline{)4.9}$ **6.** $5\overline{)3.0}$ **7.** $3\overline{)\$1.59}$

8. $8\overline{)2.728}$ **9.** $6\overline{)1.8}$ **10.** $4\overline{)3.216}$ **11.** $8\overline{)3.000}$ **12.** $9\overline{)\$4.86}$

Using More Decimal Places

Lisa wants to cut 2 m of red tape into 5 pieces that are the same length and 3 m of blue tape into 4 pieces that are the same length. How long should each piece be?

To cut 2 m of red tape into 5 pieces, divide 2 by 5.

For $5\overline{)2}$, divide the 2 ones.

$5 \times 0 = 0$

Write $5\overline{)2}$ → $\begin{array}{r} 0 \\ 5\overline{)2} \end{array}$

Think of the 2 ones as 2 ones 0 tenths, or 20 tenths.

$\begin{array}{r} 0 \\ 5\overline{)2.0} \end{array}$

Then divide the 20 tenths.

$5 \times 4 = 20$

Use 5×4 tenths = 20 tenths.

Write $\begin{array}{r} 0.4 \\ 5\overline{)2.0} \\ \underline{20} \\ 0 \end{array}$

Each piece of red tape would be 0.4 m long.

To cut 3 m of blue tape into 4 pieces, divide 3 by 4.

For $4\overline{)3}$, first use $4 \times 0 = 0$. → Write $\begin{array}{r} 0 \\ 4\overline{)3} \end{array}$ → Next, think of the 3 ones as 30 tenths. $\begin{array}{r} 0 \\ 4\overline{)3.0} \end{array}$

Divide.
Use 4×7 tenths = 28 tenths. →

Write $\begin{array}{r} 0.7 \\ 4\overline{)3.0} \\ \underline{28} \\ 2 \end{array}$

Think of the 2 tenths as 20 hundredths. →

$\begin{array}{r} 0.7 \\ 4\overline{)3.00} \\ \underline{28}\downarrow \\ 20 \end{array}$

Divide.
Use 4×5 hundredths = 20 hundredths.

Write $\begin{array}{r} 0.75 \\ 4\overline{)3.00} \\ \underline{28} \\ 20 \\ \underline{20} \\ 0 \end{array}$

Each piece of blue tape would be 0.75 m long.

Here are other examples that show how zeros in decimal places can help you complete a division.

Divide 1 by 2:

$$\begin{array}{r} 0.5 \\ 2\overline{)1.0} \\ \underline{1\,0} \\ 0 \end{array}$$

Divide 11 by 4:

$$\begin{array}{r} 2.75 \\ 4\overline{)11.00} \\ \underline{8} \\ 3\,0 \\ \underline{2\,8} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

Divide 2.6 by 8:

$$\begin{array}{r} 0.325 \\ 8\overline{)2.600} \\ \underline{2\,4} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Working Together

Complete.

1. $\begin{array}{r} 2.\blacksquare \\ 5\overline{)12.0} \\ \underline{10} \\ 2\,\blacksquare \\ \underline{\blacksquare\blacksquare} \\ \blacksquare \end{array}$

2. $\begin{array}{r} 0.6\,\blacksquare \\ 2\overline{)1.3\bigcirc} \\ \underline{\blacksquare\blacksquare\blacksquare} \\ \blacksquare\blacksquare \\ \underline{\blacksquare\blacksquare} \\ \blacksquare \end{array}$

Complete this chart.

3.	5	5.0	5.00	5.000
4.	32	?	?	?
5.		2.6	?	?
6.			10.73	?

Divide.

7. $5\overline{)7.32}$ **8.** $8\overline{)3}$ **9.** $4\overline{)\$2}$

Exercises

Divide. Use more zeros when needed.

1. $5\overline{)3}$ **2.** $4\overline{)8}$ **3.** $6\overline{)3}$

4. $8\overline{)4}$ **5.** $5\overline{)1}$ **6.** $4\overline{)1}$

7. $5\overline{)10}$ **8.** $8\overline{)7}$ **9.** $2\overline{)3}$

10. $5\overline{)4}$ **11.** $6\overline{)9}$ **12.** $8\overline{)2}$

13. $4\overline{)\$7}$ **14.** $5\overline{)\$7}$ **15.** $8\overline{)\$12}$

16. $3\overline{)5.7}$ **17.** $2\overline{)5.7}$ **18.** $5\overline{)12.3}$

19. $4\overline{)9.4}$ **20.** $2\overline{)0.75}$ **21.** $5\overline{)6.25}$

22. $4\overline{)6.5}$ **23.** $8\overline{)10.6}$ **24.** $4\overline{)3.1}$

A ball player's "batting average" is found by dividing the number of hits by the number of times at bat. The quotient always shows 3 decimal places.

What was Lisa's batting average?

1. In one game, Lisa had 1 hit in 4 times at bat.

2. After two games, she had 5 hits in 8 times at bat.

3. For the season, Lisa had 15 hits in 40 times at bat.

PROBLEM SOLVING

Practice

Dividing decimals is just like dividing whole numbers.
Study these examples.

Divide 3456 by 8.

```
   4
8)34
  32
   2
```

```
   4
8)345
  32
  25
```

```
   43
8)345
  32
  25
  24
   1
```

```
   43
8)3456
  32
  25
  24
  16
```

```
   432
8)3456
  32
  25
  24
  16
  16
   0
```

3456 ÷ 8 = 432

Divide 345.6 by 8.

```
   4
8)34
  32
   2
```

```
   4
8)345
  32
  25
```

```
   43
8)345
  32
  25
  24
   1
```

```
   43
8)345.6
  32
  25
  24
  16
```

```
   43.2
8)345.6
  32
  25
  24
  16
  16
   0
```

345.6 ÷ 8 = 43.2

Divide 34.56 by 8.

```
   4
8)34
  32
   2
```

```
   4
8)34.5
  32
  25
```

```
   4.3
8)34.5
  32
  25
  24
   1
```

```
   4.3
8)34.56
  32
  25
  24
  16
```

```
   4.32
8)34.56
  32
  25
  24
  16
  16
   0
```

34.56 ÷ 8 = 4.32

What do you think the result will be for 3.456 ÷ 8?

Use the first quotient to help you write the other quotients.

1. $3\overline{)462}$ (154) $3\overline{)46.2}$ $3\overline{)4.62}$ $3\overline{)0.462}$ $3\overline{)\$4.62}$

2. $8\overline{)3000}$ $8\overline{)300}$ $8\overline{)30}$ $8\overline{)3}$ $8\overline{)\$30.00}$

Divide.

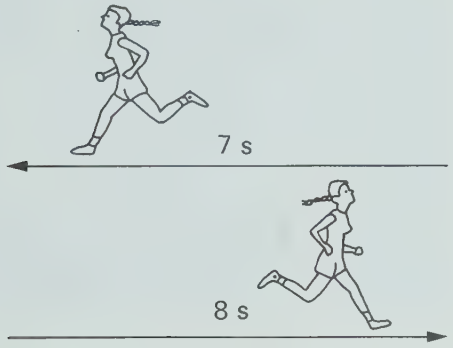
3. $6\overline{)4.8}$ **4.** $2\overline{)12.64}$ **5.** $4\overline{)6.2}$ **6.** $5\overline{)23}$ **7.** $8\overline{)31.36}$

8. $8\overline{)6}$ **9.** $7\overline{)2.632}$ **10.** $3\overline{)7.116}$ **11.** $6\overline{)6.48}$ **12.** $9\overline{)8.1}$

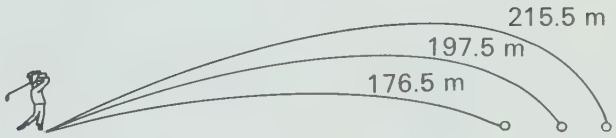
13. $4\overline{)13}$ **14.** $3\overline{)0.75}$ **15.** $7\overline{)60.004}$ **16.** $2\overline{)6.16}$ **17.** $5\overline{)18.2}$

Add, then divide to find the average.

18.

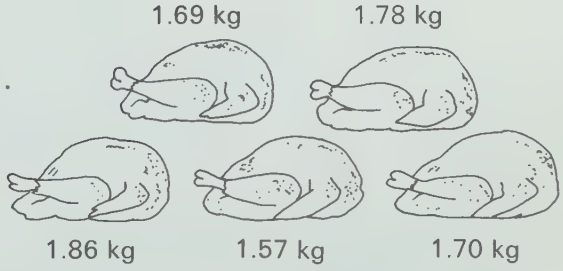


19.



20.

21.



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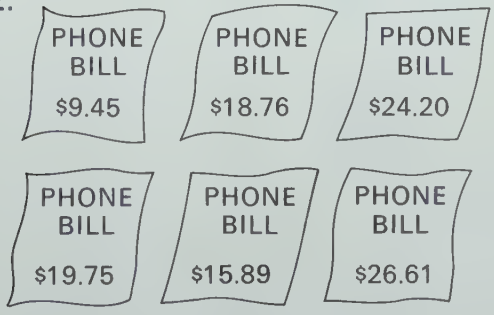


23.

My Body Temperature

Sun.	37.2°C	Mon.	36.5°C
Tues.	36.7°C	Wed.	37.0°C
Thurs.	37.8°C	Fri.	37.3°C
	Sat.	36.5°C	

Dividing by a Two-Digit Number

Anne gathered 21 rocks for her collection. The mass of all the rocks was 35.7 kg. What was the average mass of each rock?

Divide 35.7 by 21.

21 rounded to the nearest ten is 20.

For $21\overline{)35.7}$, think of $20\overline{)35.7}$.

For $20\overline{)35.7}$, think of the 3 tens 5 ones as 35 ones. Then divide the 35 ones.

$20 \times 1 = 20$
$20 \times 2 = 40$ . . . too great!

Use $21 \times 1 = 21$.

Write
$$\begin{array}{r} 1 \\ 21\overline{)35.7} \\ 21 \\ \hline 14 \end{array}$$

Think of the 14 ones 7 tenths that remain as 147 tenths.

Write
$$\begin{array}{r} 1 \\ 21\overline{)35.7} \\ 21\downarrow \\ \hline 14\,7 \end{array}$$

Then divide the 147 tenths.

$20 \times 7 = 140$
$20 \times 8 = 160$ . . . too great!

Use 21×7 tenths $= 147$ tenths.

Write
$$\begin{array}{r} 1.7 \\ 21\overline{)35.7} \\ 21 \\ \hline 14\,7 \\ 14\,7 \\ \hline 0 \end{array}$$

Place the decimal point in the quotient above the decimal point in the dividend.

The average mass of each rock was 1.7 kg.

Working Together

Give the first digit in each quotient.

1. $43\overline{)110.08}$ **2.** $12\overline{)6.48}$

Use this division to help you with this one.

$$\begin{array}{r} 13 \\ 14\overline{)182} \\ 14 \\ \hline 42 \\ 42 \\ \hline 0 \end{array}$$

3. $14\overline{)1.82}$

$15\overline{)3120}$ → **4.** $15\overline{)31.2}$

Divide.

5. $11\overline{)23.87}$ **6.** $38\overline{)\$78.28}$

7. $16\overline{)32.4}$ **8.** $25\overline{)\$85}$

Exercises

Divide.

1. $12\overline{)28.08}$ **2.** $16\overline{)6.24}$

3. $21\overline{)21.84}$ **4.** $25\overline{)\$48.50}$

5. $22\overline{)31.9}$ **6.** $64\overline{)56}$

7. $72\overline{)90}$ **8.** $23\overline{)\$7.36}$

9. $24\overline{)17.4}$ **10.** $17\overline{)18.632}$

11. $74\overline{)103.6}$ **12.** $14\overline{)\$49}$

13. $86\overline{)64.5}$ **14.** $43\overline{)18.404}$

15. $32\overline{)12}$ **16.** $57\overline{)\$144.78}$

17. $14\overline{)4.270}$ **18.** $28\overline{)103.6}$

When the divisor → $\square\overline{)\square}$ is greater than the dividend, the quotient is less than 1.

Study these patterns.

$7 \times 10 = 70$ $2 \times 100 = 200$

$83 \times 10 = 830$ $32 \times 100 = 3\,200$

$502 \times 10 = 5020$ $460 \times 100 = 46\,000$

1. Give a rule for multiplying by 10 and a rule for multiplying by 100.

Study these patterns.

$30 \div 10 = 3$ $700 \div 100 = 7$

$400 \div 10 = 40$ $2\,800 \div 100 = 28$

$2460 \div 10 = 246$ $90\,000 \div 100 = 900$

2. Give a rule for dividing by 10 and a rule for dividing by 100.

Study these patterns.

$7.2 \times 10 = 72$ $3.9 \times 100 = 390$

$3.64 \times 10 = 36.4$ $8.51 \times 100 = 851$

$0.42 \times 10 = 4.2$ $0.235 \times 100 = 23.5$

3. Do your rules for Exercise 1 still work?

Study these patterns.

$6 \div 10 = 0.6$ $3 \div 100 = 0.03$

$0.735 \div 10 = 0.0735$ $5.8 \div 100 = 0.058$

$14.2 \div 10 = 1.42$ $279.3 \div 100 = 2.793$

4. Do your rules for Exercise 2 still work?

try this

Practice

Divide.

1. $8\overline{)23.2}$	**2.** $19\overline{)57.95}$	**3.** $5\overline{)4.1}$	**4.** $24\overline{)156}$	**5.** $7\overline{)\$22.47}$
6. $9\overline{)6.993}$	**7.** $8\overline{)29}$	**8.** $35\overline{)57.4}$	**9.** $2\overline{)0.73}$	**10.** $33\overline{)\$22.11}$
11. $32\overline{)4}$	**12.** $58\overline{)178.06}$	**13.** $3\overline{)19.26}$	**14.** $16\overline{)9.2}$	**15.** $8\overline{)\$6}$
16. $4\overline{)8.024}$	**17.** $43\overline{)30.1}$	**18.** $29\overline{)9.57}$	**19.** $6\overline{)3}$	**20.** $52\overline{)\$169}$

Use $>$, $<$, or $=$ to make true statements.

Example: $1.23 \div 3 \bigcirc 12.3 \div 3$

$$\begin{array}{r} 0.41 \\ 3\overline{)1.23} \end{array} \qquad \begin{array}{r} 4.1 \\ 3\overline{)12.3} \end{array}$$

Write $1.23 \div 3 < 12.3 \div 3$

21. $18.25 \div 5 \bigcirc 11.25 \div 3$

22. $26.25 \div 7 \bigcirc 33.75 \div 9$

23. $21 \div 8 \bigcirc 15 \div 6$

24. $2.54 \div 4 \bigcirc 3.75 \div 6$

25. $20.35 \div 5 \bigcirc 18.8 \div 4$

26. $75.15 \div 9 \bigcirc 58.45 \div 7$

These are special division pairs.
Divide. Then multiply the quotients.

27. $2\overline{)5}$ and $5\overline{)2}$

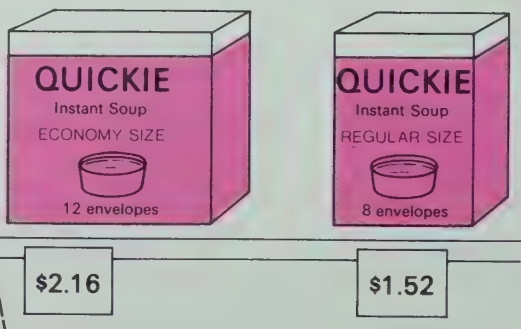
28. $7\overline{)28}$ and $28\overline{)7}$

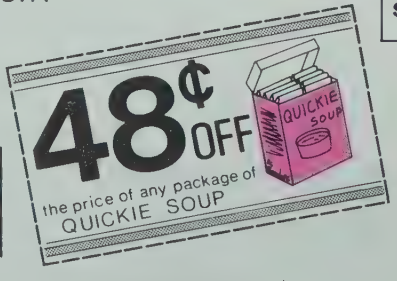
29. $1\overline{)8}$ and $8\overline{)1}$

PROBLEM SOLVING

What is the cost of each envelope of soup

1. in the Economy-size package?
2. in the Regular-size package?
3. in the Economy-size package with this coupon?

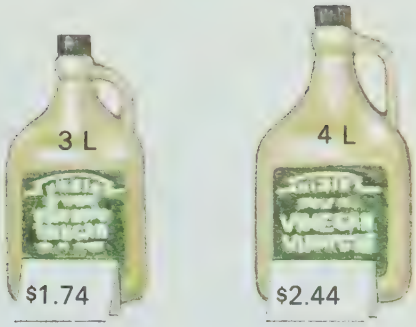




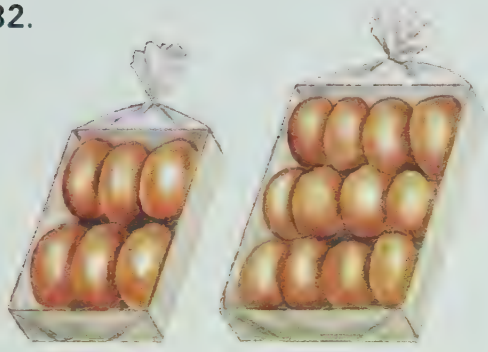
Find the better offer in each pair.

30.

31.

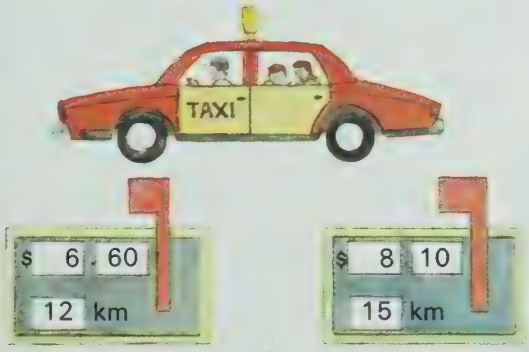


32.

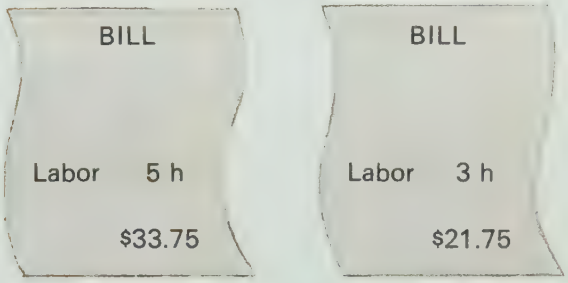


33.

34.



35.



*__36.__ Which is the best offer?

Recognizing Incorrect Results

When she multiplied 274.6 and 1.2, Natalie expected a product close to 274.6.

But her calculator display showed

274.6 × 1.2 should be close to 274.6 × 1, or 274.6.

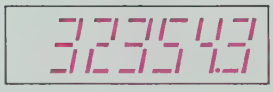
I must have made a mistake!

Did I forget to press the decimal point key for one of the factors?

Can you find a mistake that Natalie might have made to get a product of 3295.2?

One display is correct. For the other displays, either an incorrect operation key was pressed or a decimal was entered incorrectly. Find the correct display. Find a mistake that would give the other displays.

1. 482.9 [×] 67 [=] _____



2. 76.49 [+] 25.98 [−] 57.75 [=] _____

3. 14.5 [×] 9.6 [÷] 32 [=] _____

Rounding and estimating can help you find the correct display and the mistakes that gave the other displays.

Calculator

Logical Thinking

Use the information given and list the students in order from tallest to shortest.

Laura Greg Anne Ryan Leslie

Laura is taller than Anne.

Greg is not the shortest.

Laura is as heavy as Leslie.

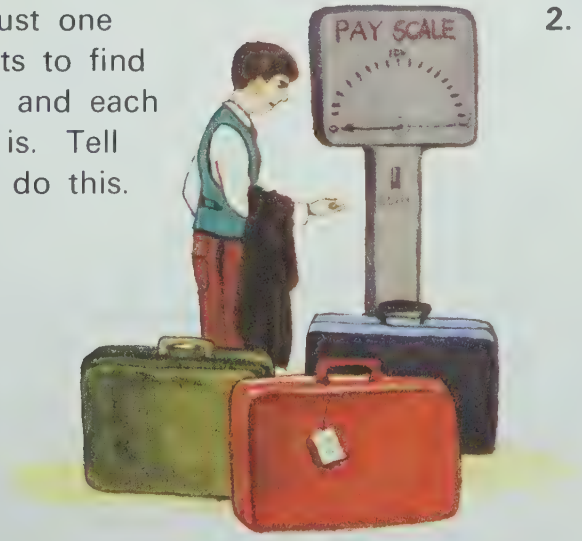
Ryan is not as short as Laura.

Leslie is taller than Greg but not as tall as Laura.

When you think you have them in order, turn the page to check your list.

After the pointer stops, the only direction it can move is down the scale. It will not move up the scale until another coin is used.

1. Mr. Koll has just one coin. He wants to find how heavy he and each of his 3 bags is. Tell how he could do this.



Cheryl has a card that is 5 cm long and 3 cm wide.

2. Show how she can use the card to draw a line segment 2 cm long.

PROBLEM SOLVING

Does the list you made for the problem on page 255 agree with what you see in this picture?

When you solve problems, always read carefully and be sure you understand the given information.

One of these line segments is 7 cm long. The other is 4 cm long. Use pencil, eraser, tracing paper, and an unmarked straight edge to draw a line segment that is

3. 1 cm long.
4. 2 cm long.
5. 3 cm long.
6. 5 cm long.
7. 6 cm long.
8. 8 cm long.
9. 9 cm long.
10. 10 cm long.
11. What other lengths could you draw?

You can do these in any order.

Read these carefully and be sure you understand the given information.

12. If your doctor gives you 3 pills and says to take one every half hour, how long will they last?

13. When you go to bed one night at 20:00 and set the alarm to get up at 09:00, how many hours of sleep will you get?

14. A rancher had 17 steers. All but 9 were sold. How many steers were left?

PROBLEM SOLVING

Checking Up

Divide.

1. $2\overline{)7.6}$ **2.** $8\overline{)51.2}$ **3.** $3\overline{)\$17.16}$ **4.** $7\overline{)3.346}$

5. $5\overline{)3.5}$ **6.** $9\overline{)40.545}$ **7.** $7\overline{)\$6.02}$ **8.** $6\overline{)15}$

9. $4\overline{)2.5}$ **10.** $5\overline{)7.1}$ **11.** $4\overline{)\$26}$ **12.** $8\overline{)7}$

Solve.

13. Georgette ran 2 laps in 35 s. If each lap took the same time, how long did it take to run 1 lap?

14. Bob bought rolls by the baker's dozen for $2.99. There are 13 in a baker's dozen. Hov much did Bob pay for 1 roll?

15.

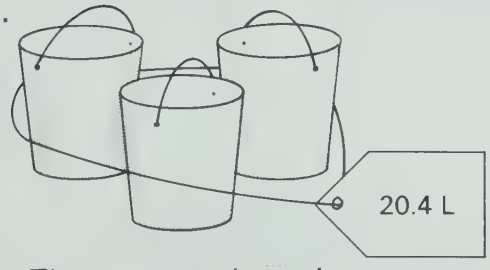
The perimeter of this square is 5.5 km. How long is one side?

16.

6 m

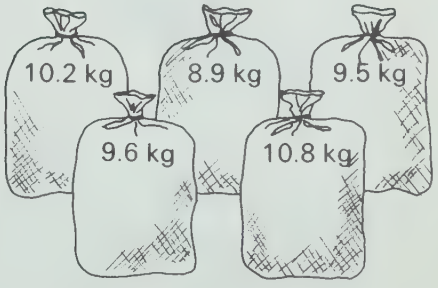
The area of this rectangle is 57 m². How long is this side?

17.



The average is ⋯ L.

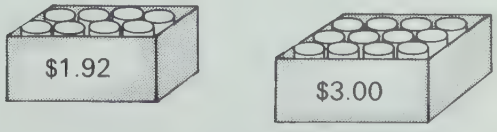
18.



The average is ⋯ kg.

19. The product of two numbers is 64.26. One number is 14. What is the other number?

20. If all the cans are the same size, which carton is the better buy?



Divide.

21. $24\overline{)73.68}$ **22.** $15\overline{)18.6}$ **23.** $32\overline{)\$217.28}$ **24.** $19\overline{)13.87}$

13 FRACTIONS

Writing Fractions

There are 5 eggs left in the carton.
There were 6 eggs in it when it was full.

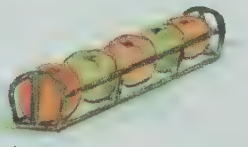
The fraction shows what part of the carton still has eggs.

$\frac{5}{6}$ five-sixths

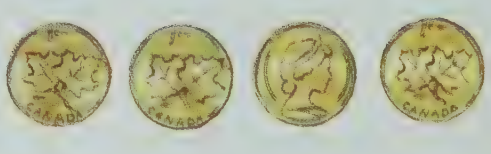
In a fraction, the number above the bar is the **numerator**. The number below the bar is the **denominator**.

Working Together

Complete each sentence by using a denominator that shows how many there are in all.



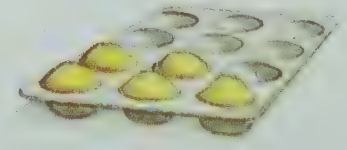
1. $\frac{3}{\blacksquare}$ of the tomatoes are ripe.



2. $\frac{1}{\blacksquare}$ of the pennies shows "heads".

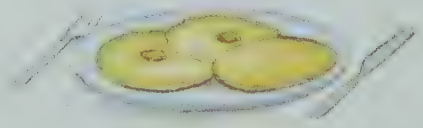
Complete each sentence by using a numerator that shows how many are empty.

3. $\frac{\blacksquare}{6}$ of the bottles are empty.

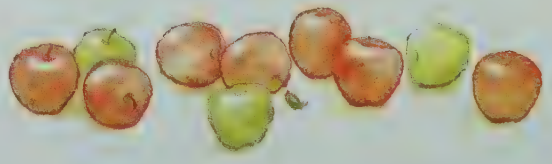


4. $\frac{\blacksquare}{12}$ of the cups are empty.

Complete each sentence with a fraction.



5. $\frac{\blacksquare}{\blacksquare}$ of the pancakes have butter.



6. $\frac{\blacksquare}{\blacksquare}$ of the apples are green.

Exercises

Complete each sentence with a fraction.

1. ▫/▪ of the eggs are broken.

2. ▪/▪ of the cake has been taken.

3.

▫/▪ of the boys have apples. ▫/▪ of the boys have bananas. ▫/▪ of the boys have melon.

Write the fraction

4. with denominator 7 and numerator 5.

5. with numerator 4 and denominator 10.

Write a sentence with a fraction for these.

6. 5 goats are in a pen.
2 of them have horns.

7. 12 kittens are playing with string.
5 of them get tangled.

Do these on a large sheet of paper.

	If	Draw shapes to show
8.	is $\frac{1}{4}$	$\frac{3}{4}$
9.	is $\frac{1}{3}$	$\frac{2}{3}$
10.	is $\frac{1}{2}$	1

	If	Draw shapes to show
11.	is $\frac{1}{3}$	1
12.	is $\frac{1}{4}$	1
***13.**	is $\frac{2}{6}$	$\frac{5}{6}$

6 and 10 are factors of 60 because

$$60 = 6 \times 10.$$

4 and 15 are also factors of 60 because

$$60 = 4 \times 15.$$

1. Name 2 other factors of 60.

2. Name 5 factors of 210.

A whole number greater than 1 that has itself and 1 as its only factors is a **prime number**.

$$23 = 1 \times 23.$$

This is the only way to show 23 as a product of whole numbers.
23 is a prime number.

Since $24 = 3 \times 8$, 24 is not a prime number.

3. List the prime numbers from 2 to 100.

A factor that is a prime number is a **prime factor**.

List the prime factors

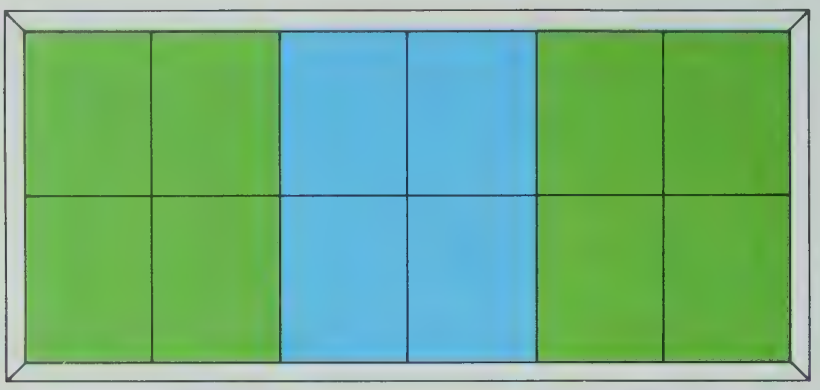
4. of 12.

5. of 1386.

try this

Equivalent Fractions

Ginny covered the bulletin board with construction paper.



She used blue and green to make three parts all the same size.

She used 12 sheets of construction paper.

$\frac{1}{3}$ is blue. $\frac{2}{3}$ is green.

$\frac{4}{12}$ is blue. $\frac{8}{12}$ is green.

$$\frac{1}{3} = \frac{4}{12}$$

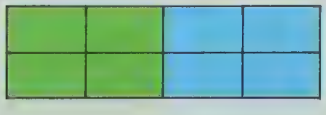
$\frac{1}{3}$ and $\frac{4}{12}$ are **equivalent fractions**.

$$\frac{2}{3} = \frac{8}{12}$$

$\frac{2}{3}$ and $\frac{8}{12}$ are also equivalent fractions.

Working Together

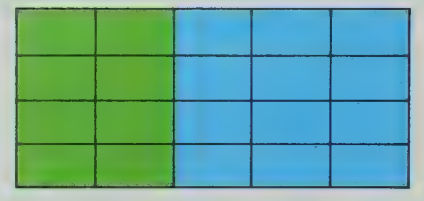
Give the numerators that complete each sentence.

1. 

$\frac{\square}{8} = \frac{\square}{2}$

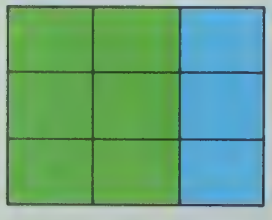
2.

$\frac{\square}{12} = \frac{3}{4}$ $\frac{3}{12} = \frac{\square}{4}$

3. 

$\frac{\square}{20} = \frac{\square}{10}$ $\frac{\square}{10} = \frac{\square}{5}$ $\frac{\square}{20} = \frac{\square}{5}$

Give two equivalent fractions for each picture.

4. 

5.

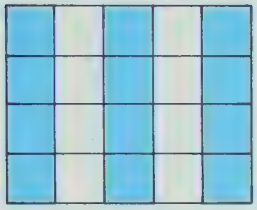
6.

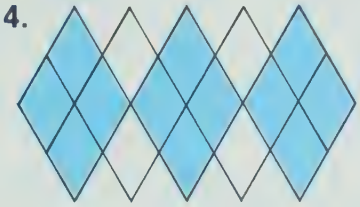
Exercises

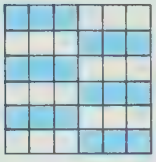
Write two equivalent fractions for each picture.

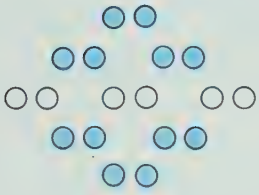
1.

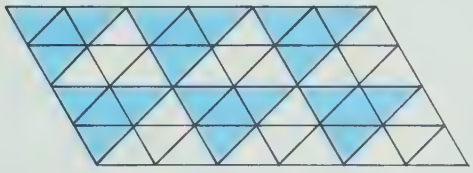
2.

3. 

4. 

5. 

6. 

7. 

***8.**

Here are four ways to show 30 as a product.

$1 \times 30 = 30$ $2 \times 15 = 30$ $3 \times 10 = 30$ $5 \times 6 = 30$

Here are four ways to show 24 as a product.

$1 \times 24 = 24$ $2 \times 12 = 24$ $3 \times 8 = 24$ $4 \times 6 = 24$

The factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30

The factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24

The **common factors** of 30 and 24 are 1, 2, 3, 6

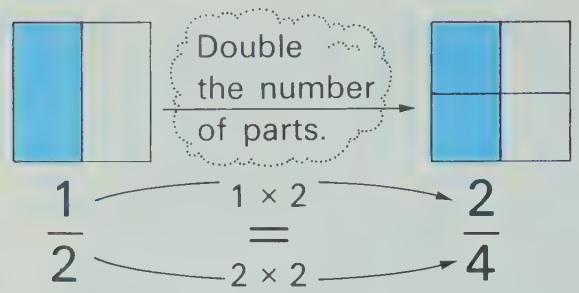
List all the factors of the numbers in each pair.
Then draw rings around their common factors.

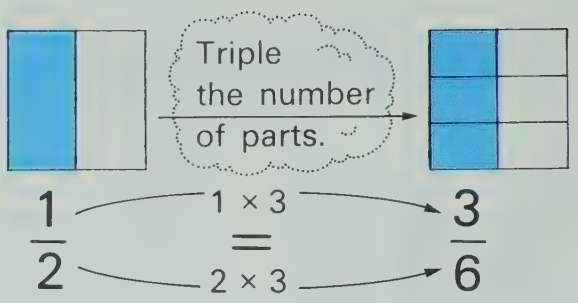
1. 12 and 18 **2.** 40 and 100 **3.** 84 and 315 **4.** 52 and 78

try this

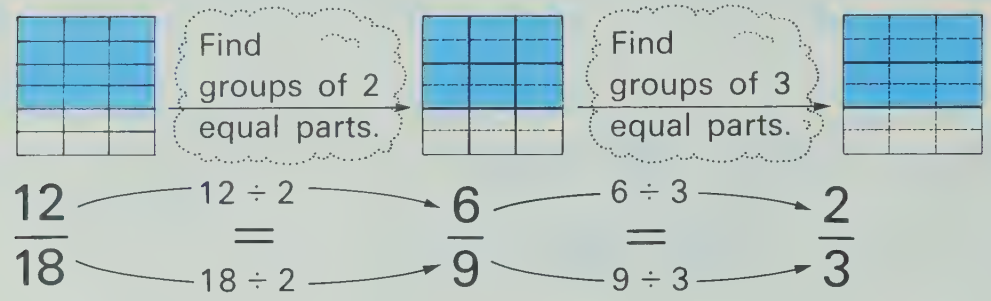
Finding Equivalent Fractions

Multiplication can be used to find equivalent fractions.





Division can be used to find equivalent fractions.



Exercises

Multiply or divide to find equivalent fractions.

1. $\frac{1}{2}$ = $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$

1×2, 1×3, 1×4, ...

2×2, 2×3, 2×4, ...

2. $\frac{12}{30}$ = $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$

$12 \div 2$, $6 \div 3$

$30 \div 2$, $15 \div 3$

3. $\frac{3}{8}$ = $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$

3×2, 3×3, ...

8×2, 8×3, ...

4. $\frac{63}{84}$ = $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$

$63 \div 3$, $? \div 7$

$84 \div 3$, $? \div 7$

5. $\frac{5}{6}$ = $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$

5×2, ...

6×2, ...

6. $\frac{40}{70}$ = $\frac{\blacksquare}{\blacksquare}$ $\frac{\blacksquare}{\blacksquare}$

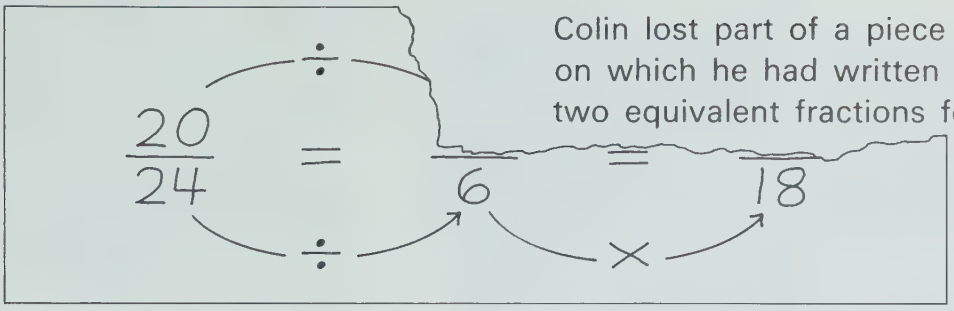
$40 \div 2$

$70 \div 2$

When there is no whole number that divides both numerator and denominator, the fraction is in **lowest terms.**

Do you know a way to find the lowest terms in just one step?

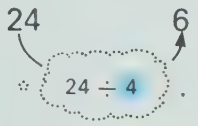
Finding the Missing Term



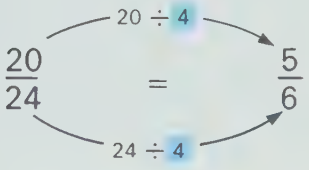
Colin lost part of a piece of paper on which he had written two equivalent fractions for $\frac{20}{24}$.

To find the first missing term,

think * * * * 24 ÷ 4 .



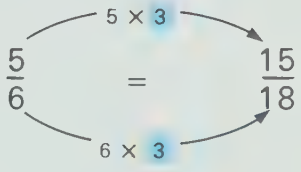
Then, divide 20 by 4.



To find the second missing term,

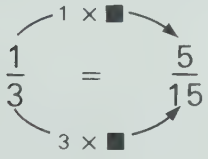
think * * * * 6 × 3 .

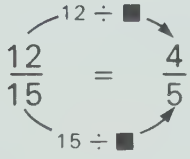
Then, multiply 5 by 3.



Working Together

What factor is used to get the equivalent fraction?

1. 

2. 

Find the missing term.

3. $\frac{3}{4} = \frac{\blacksquare}{16}$

4. $\frac{2}{7} = \frac{6}{\blacksquare}$

5. $\frac{6}{12} = \frac{\blacksquare}{2}$

6. $\frac{15}{25} = \frac{3}{\blacksquare}$

Exercises

Find the missing term.

1. $\frac{2}{3} = \frac{\blacksquare}{12}$

2. $\frac{1}{4} = \frac{9}{\blacksquare}$

3. $\frac{7}{42} = \frac{\blacksquare}{6}$

4. $\frac{21}{36} = \frac{7}{\blacksquare}$

5. $\frac{5}{8} = \frac{\blacksquare}{16}$

Complete the equivalent fractions in each chart.

6.

$\frac{\blacksquare}{5}$	$\frac{16}{\blacksquare}$	$\frac{4}{10}$	$\frac{\blacksquare}{30}$	$\frac{8}{\blacksquare}$

7.

$\frac{\blacksquare}{10}$	$\frac{9}{\blacksquare}$	$\frac{\blacksquare}{2}$	$\frac{8}{16}$	$\frac{12}{\blacksquare}$

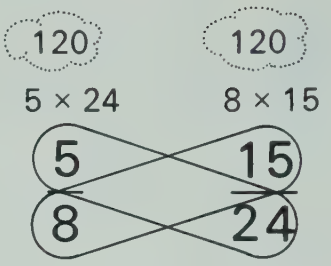
8.

$\frac{\blacksquare}{12}$	$\frac{24}{32}$	$\frac{18}{\blacksquare}$	$\frac{\blacksquare}{48}$	$\frac{3}{\blacksquare}$

Checking for Equivalent Fractions

Cross products can be used to check whether two fractions are equivalent.

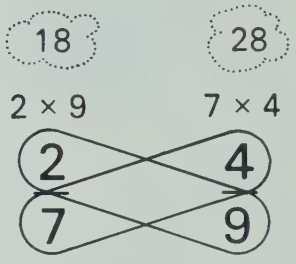
For the fractions $\frac{5}{8}$ and $\frac{15}{24}$, both cross products are 120.



When the cross products for two fractions are equal, the fractions are equivalent.

$$\frac{5}{8} = \frac{15}{24}$$

For the fractions $\frac{2}{7}$ and $\frac{4}{9}$, the cross products are 18 and 28.



When the cross products for two fractions are not equal, the fractions are not equivalent.

$$\frac{2}{7} \neq \frac{4}{9}$$

The symbol "≠" means "is not equal to".

Working Together

Find the cross products. Are the fractions equivalent?

1. $\frac{1}{2}, \frac{7}{14}$ **2.** $\frac{4}{5}, \frac{7}{8}$ **3.** $\frac{6}{9}, \frac{8}{12}$

Exercises

Find the cross products. Are the fractions equivalent?

1. $\frac{21}{28}, \frac{3}{4}$ **2.** $\frac{2}{7}, \frac{3}{9}$ **3.** $\frac{12}{36}, \frac{2}{6}$ **4.** $\frac{14}{35}, \frac{6}{15}$ **5.** $\frac{7}{8}, \frac{7}{9}$

Use cross products to help you answer the questions.

6. When Shirley was given 32 of the 48 beads, she was told that she was getting $\frac{2}{3}$ of the beads. Was she?

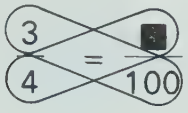
7. After cultivating 72 of the 95 rows, the farmer said that $\frac{3}{4}$ of the field was cultivated. Was it?

Finding the Missing Term Using Cross Products

Louise placed 100 beans on a damp paper towel. 3 d later, $\frac{3}{4}$ of them had sprouted. What fraction, with 100 as denominator, is equivalent to $\frac{3}{4}$?

To find the value of ■ in $\frac{3}{4} = \frac{■}{100}$, use cross products.

$3 \times 100 \quad 4 \times ■$



$4 \times ■ = 3 \times 100 \quad 4 \times ■ = 300 \quad 4 \times 75 = 300$

$300 \div 4 = 75$

In 3 d, 75 beans had sprouted. $\frac{3}{4} = \frac{75}{100}$

Working Together

Write a sentence showing equal cross products.

Example: For $\frac{2}{3} = \frac{10}{■}$, write $2 \times ■ = 3 \times 10$.

1. $\frac{4}{5} = \frac{■}{10}$ **2.** $\frac{3}{7} = \frac{12}{■}$ **3.** $\frac{2}{8} = \frac{■}{100}$

Find the missing term.

Example: For $5 \times ■ = 8 \times 10$, or 80, divide 80 by 5 to find a value for ■.

4. $2 \times ■ = 3 \times 10$ **5.** $5 \times ■ = 4 \times 10$ **6.** $\frac{3}{7} = \frac{12}{■}$ **7.** $\frac{6}{8} = \frac{■}{100}$

Exercises

Use cross products to find the missing term.

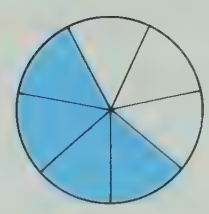
1. $\frac{1}{3} = \frac{6}{■}$ **2.** $\frac{1}{7} = \frac{■}{49}$ **3.** $\frac{2}{5} = \frac{6}{■}$ **4.** $\frac{2}{3} = \frac{■}{9}$ **5.** $\frac{2}{9} = \frac{16}{■}$

6. $\frac{8}{32} = \frac{■}{4}$ **7.** $\frac{25}{30} = \frac{5}{■}$ **8.** $\frac{30}{48} = \frac{■}{8}$ **9.** $\frac{12}{24} = \frac{1}{■}$ **10.** $\frac{14}{18} = \frac{■}{9}$

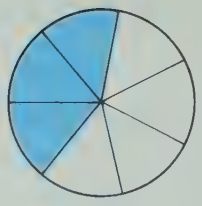
11. $\frac{6}{8} = \frac{9}{■}$ **12.** $\frac{10}{14} = \frac{■}{21}$ **13.** $\frac{12}{15} = \frac{20}{■}$ **14.** $\frac{2}{12} = \frac{■}{30}$ **15.** $\frac{12}{32} = \frac{15}{■}$

Comparing Fractions

To compare fractions with like denominators, compare the numerators.



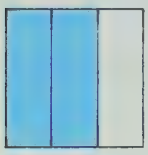
$4 > 3$, so $\frac{4}{7} > \frac{3}{7}$.



Like denominators are often called **common denominators**.

4 is greater than 3, so $\frac{4}{7}$ is greater than $\frac{3}{7}$.

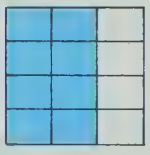
To compare fractions with unlike denominators, first write equivalent fractions with like denominators.



$\frac{2}{3}$

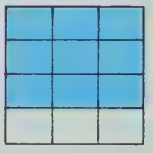
becomes

$\frac{8}{12}$

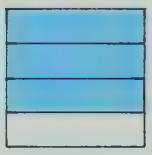


Then, compare the numerators.

$\frac{8}{12} < \frac{9}{12}$, so $\frac{2}{3} < \frac{3}{4}$.



$\frac{9}{12}$



$\frac{3}{4}$

becomes

$\frac{8}{12}$ is less than $\frac{9}{12}$, so $\frac{2}{3}$ is less than $\frac{3}{4}$.

Here is a way to find like denominators for two fractions.

For $\frac{3}{5}$ and $\frac{4}{7}$, the unlike denominators are 5 and 7.

$\frac{3}{5}$ $\quad$ $\overline{5 \times 7}$ $\quad$ 5×7

$\frac{3}{5} = \frac{21}{35}$ $\quad$ 3×7, 5×7

$\frac{4}{7}$ $\quad$ $\overline{7 \times 5}$ $\quad$ 7×5

$\frac{4}{7} = \frac{20}{35}$ $\quad$ 4×5, 7×5

Since $5 \times 7 = 7 \times 5$, the two new denominators are alike.

$\frac{21}{35} > \frac{20}{35}$, so $\frac{3}{5} > \frac{4}{7}$.

Working Together

For the fractions in each pair, give equivalent fractions with like denominators.

1. $\frac{1}{2}, \frac{4}{9}$ **2.** $\frac{2}{3}, \frac{5}{7}$ **3.** $\frac{3}{4}, \frac{4}{6}$

Use $>$, $<$, or $=$ to make true statements.

4. $\frac{1}{2} \bigcirc \frac{4}{9}$ **5.** $\frac{2}{3} \bigcirc \frac{5}{7}$

Exercises

For each of these, show equivalent fractions with like denominators. Then, use $>$, $<$, or $=$ to make a true statement.

Example: $\frac{4}{9} = \frac{28}{63}$

$\frac{3}{7} = \frac{27}{63}$

$\frac{28}{63} > \frac{27}{63}$ so $\frac{4}{9} > \frac{3}{7}$

1. $\frac{3}{4} \bigcirc \frac{4}{7}$ **2.** $\frac{6}{16} \bigcirc \frac{3}{8}$

3. $\frac{1}{3} \bigcirc \frac{2}{5}$ **4.** $\frac{3}{7} \bigcirc \frac{4}{10}$

5. $\frac{10}{25} \bigcirc \frac{6}{15}$ **6.** $\frac{2}{9} \bigcirc \frac{1}{5}$

7. $\frac{7}{12} \bigcirc \frac{2}{3}$ **8.** $\frac{7}{9} \bigcirc \frac{5}{6}$

List from least to greatest.

***9.** $\frac{2}{7}, \frac{3}{7}, \frac{3}{8}$ ***10.** $\frac{4}{12}, \frac{6}{15}, \frac{6}{14}$

List from greatest to least.

***11.** $\frac{3}{4}, \frac{3}{5}, \frac{4}{5}$ ***12.** $\frac{3}{7}, \frac{4}{8}, \frac{5}{9}$

Pies are often cut into sixths or eighths.

13. Which is more, $\frac{1}{6}$ of a pie or $\frac{1}{8}$ of a pie?

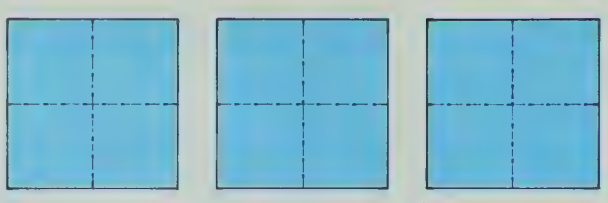
14. Which is more, $\frac{4}{6}$ of a pie or $\frac{5}{8}$ of a pie?

15. Which is more, 2 pieces of a pie that is cut into sixths or 3 pieces of a pie that is cut into eighths?

***16.** $\frac{5}{6}$ of the blueberry pie has been eaten. $\frac{7}{8}$ of the apple pie has been eaten. Of which pie is there more left?

Changing to Improper Fractions

A whole number can be written as an **improper fraction**.



3 tiles or $\frac{12}{4}$ tiles

In an improper fraction, the numerator is greater than or equal to the denominator.

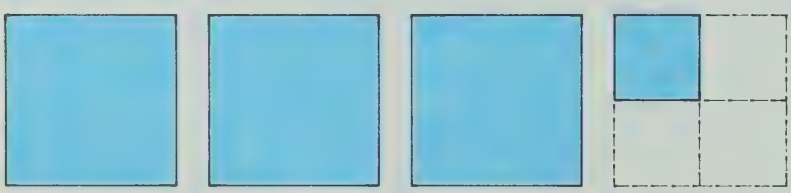
In a **proper fraction,** the denominator is greater than the numerator.

To find how many fourths there are in the whole number 3, multiply

3×4 fourths $= 12$ fourths or $\frac{12}{4}$.

3 groups of 4 fourths

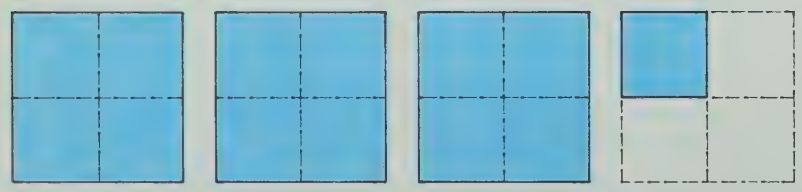
A number in **mixed form** can represent a whole amount together with some part of a whole.



$3\frac{1}{4}$ tiles

3 and $\frac{1}{4}$

It can also be written as an improper fraction.



$\frac{13}{4}$ tiles

For a number in mixed form, change the whole number first.

For $3\frac{1}{4}$, 3 and $\frac{1}{4} = \frac{12}{4}$ and $\frac{1}{4}$, or $\frac{13}{4}$.

Change the whole number first.

$3\frac{1}{4}$

Multiply, then add.

Working Together

Multiply to write improper fractions for the whole number.

		3 × 2	3 × 3	3 × 4	...
1.	3	$\frac{\blacksquare}{2}$	$\frac{\blacksquare}{3}$	$\frac{\blacksquare}{4}$	$\frac{\blacksquare}{5}$
2.	7	$\frac{\blacksquare}{2}$	$\frac{\blacksquare}{3}$	$\frac{\blacksquare}{5}$	$\frac{\blacksquare}{8}$

Change the whole number first. Then write each of these as an improper fraction.

Example: $2\frac{7}{8}$ is $\frac{16}{8}$ and $\frac{7}{8}$, or $\frac{23}{8}$.

3. $1\frac{2}{3}$ **4.** $5\frac{1}{2}$ **5.** $3\frac{5}{6}$

Multiply, then add to change each of these to an improper fraction.

Example: For $6\frac{④}{7}$, write $\frac{6 \times 7 + ④}{7}$, or $\frac{46}{7}$.

6. $4\frac{1}{8}$ **7.** $1\frac{3}{10}$ **8.** $7\frac{3}{5}$

Exercises

Complete.

1.	2	$\frac{\blacksquare}{2}$	$\frac{\blacksquare}{4}$	$\frac{\blacksquare}{7}$	$\frac{\blacksquare}{12}$
2.	5	$\frac{\blacksquare}{2}$	$\frac{\blacksquare}{5}$	$\frac{\blacksquare}{6}$	$\frac{\blacksquare}{10}$

Change to improper fractions.

3. $1\frac{1}{2}$ **4.** $4\frac{1}{5}$ **5.** $3\frac{3}{4}$ **6.** $7\frac{2}{3}$

7. $1\frac{3}{7}$ **8.** $9\frac{3}{8}$ **9.** $2\frac{1}{2}$ **10.** $6\frac{5}{8}$

11. $2\frac{5}{9}$ **12.** $8\frac{1}{6}$ **13.** $1\frac{4}{5}$ **14.** $3\frac{7}{12}$

15. $5\frac{6}{7}$ **16.** $12\frac{1}{4}$ **17.** $4\frac{2}{3}$ **18.** $2\frac{1}{3}$

Complete.

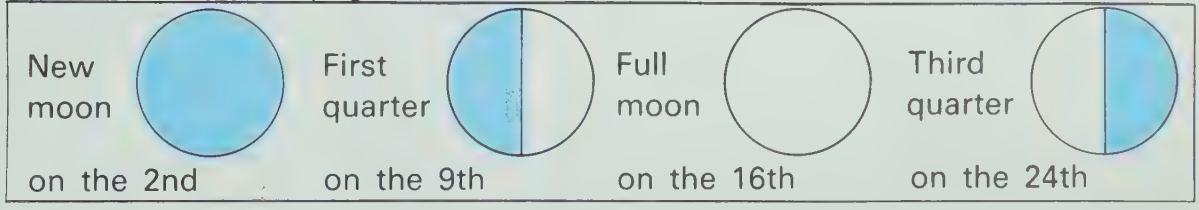
19.

$3\frac{3}{8}$ oranges = $\frac{\blacksquare}{8}$ oranges

20.

$2\frac{3}{4}$ waffles = $\frac{\blacksquare}{4}$ waffles

On some calendar pages you will see this information.



1. Explain why the terms "first quarter" and "third quarter" are used as shown.

How many of these terms can you explain?

2. quarter note **3.** halfback **4.** quarterfinal
5. half brother **6.** half-mast **7.** quarter horse
8. half nelson **9.** halfhearted **10.** quarterly

PROBLEM SOLVING

Changing Improper Fractions

Eddie estimates that he was able to watch 21 quarters of football during the season. How many whole games is 21 quarters equivalent to?

Each football game has 4 quarters.

Eddie has watched about $\frac{21}{4}$ games.

To change the improper fraction $\frac{21}{4}$ to a number in mixed form,

think of $\frac{21}{4}$

as $\frac{20}{4}$ and $\frac{1}{4}$,

or 5 and $\frac{1}{4}$. $5\frac{1}{4}$

OR

divide to find how many groups of 4 fourths there are in 21.

$$\begin{array}{r} 5 \\ 4\overline{)21} \\ \underline{20} \\ 1 \end{array}$$

5 whole games

1 quarter of another game

$5\frac{1}{4}$

There is as much playing time in $5\frac{1}{4}$ football games as there is in 21 quarters.

Working Together

Show the quotient and remainder as a number in mixed form.

Example: For $\begin{array}{r} 4 \\ 7\overline{)31} \\ \underline{28} \\ 3 \end{array}$, write $4\frac{3}{7}$.

1. $\begin{array}{r} 3 \\ 5\overline{)16} \\ \underline{15} \\ 1 \end{array}$

2. $\begin{array}{r} 5 \\ 3\overline{)17} \\ \underline{15} \\ 2 \end{array}$

3. $\begin{array}{r} 6 \\ 8\overline{)53} \\ \underline{48} \\ 5 \end{array}$

Divide the numerator by the denominator. Show the quotient and remainder as a number in mixed form.

Example: For $\frac{23}{6}$,

divide $\begin{array}{r} 3 \\ 6\overline{)23} \\ \underline{18} \\ 5 \end{array}$ and write $3\frac{5}{6}$.

4. $\frac{24}{5}$

5. $\frac{20}{3}$

6. $\frac{64}{8}$

7. $\frac{53}{12}$

Sometimes you get a whole number.

Exercises

Write each improper fraction as a number in mixed form or as a whole number.

1. $\frac{11}{2}$	**2.** $\frac{4}{3}$	**3.** $\frac{81}{9}$	**4.** $\frac{13}{4}$	**5.** $\frac{41}{10}$
6. $\frac{41}{12}$	**7.** $\frac{20}{7}$	**8.** $\frac{27}{8}$	**9.** $\frac{36}{6}$	**10.** $\frac{12}{5}$
11. $\frac{33}{4}$	**12.** $\frac{17}{10}$	**13.** $\frac{32}{3}$	**14.** $\frac{23}{12}$	**15.** $\frac{64}{7}$
16. $\frac{59}{5}$	**17.** $\frac{144}{12}$	**18.** $\frac{130}{7}$	**19.** $\frac{112}{10}$	**20.** $\frac{223}{8}$

Write a number in mixed form to complete each sentence.

21. There are 30 d in June. There are $\frac{30}{7}$ weeks or ▒ weeks in June.

22. 12 eggs fill a carton. 91 eggs will fill $\frac{91}{12}$ cartons or ▒ cartons.

23. 4 wheels make up a set. 23 wheels will make up ▒ sets of wheels.

24. 5 riders make up a carload. 33 riders will make up ▒ carloads.

25. 3 lemons are needed for each recipe. With 8 lemons you could make ▒ recipes.

26. Each guest was served an eighth of a pie. There were 21 guests, so ▒ pies were used.

27. The restaurant sold 151 "quarter chickens". This would be ▒ "whole chickens".

28. 101 quarter-dollars are worth ▒ whole dollars.

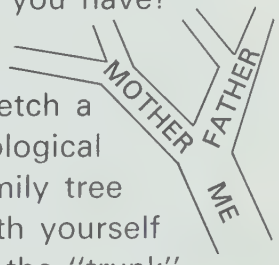
Each person has one pair of *biological* parents.

1. How many biological grandparents do you have?

2. How many biological great-grandparents do you have?

3. How many biological great-great-grandparents do you have?

4. Sketch a biological family tree with yourself as the "trunk".



5. If you continue the number pattern that shows how many biological *ancestors* you had in each *generation*, how many would there be 20 generations ago?

6. If each pair of grandparents had 3 children and each of these children had 3 children, how many cousins would you have?

PROBLEM SOLVING

Adding Fractions

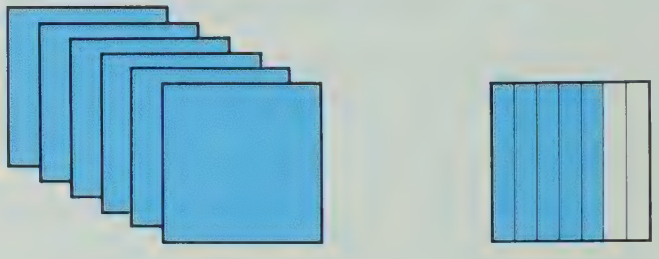
Add $4\frac{2}{7}$ and $2\frac{3}{7}$.

$$4\frac{2}{7}$$

$$2\frac{3}{7}$$

Add sevenths.
Then add ones.

$$6\frac{5}{7}$$



The sum of $4\frac{2}{7}$ and $2\frac{3}{7}$ is $6\frac{5}{7}$.

Add $2\frac{4}{5}$ and $1\frac{3}{5}$.

$$2\frac{4}{5}$$

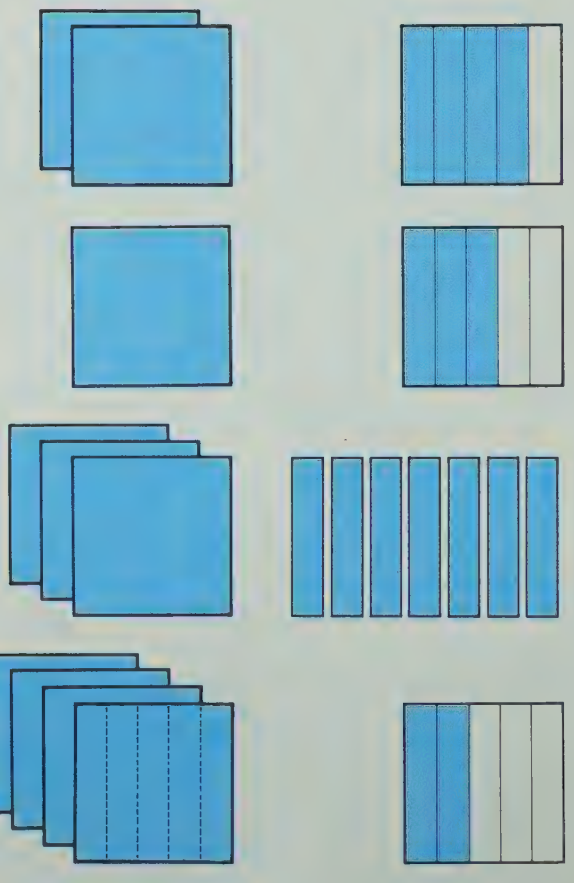
$$1\frac{3}{5}$$

Add fifths.
Then add ones.

$$3\frac{7}{5}$$

or

$$4\frac{2}{5}$$



Remember that $\frac{7}{5} = 1\frac{2}{5}$, so $3\frac{7}{5} = 4\frac{2}{5}$.

The sum of $2\frac{4}{5}$ and $1\frac{3}{5}$ is $4\frac{2}{5}$.

Working Together

Add the fractions.

1. $\frac{1}{6}$
   $\frac{3}{6}$
   ———

2. $\frac{5}{8} + \frac{2}{8}$

Add the fractions. Then add the whole numbers.

3. $3\frac{2}{9}$
   $2\frac{4}{9}$
   ———

4. $3\frac{1}{4} + 7\frac{1}{4}$

Regroup the sum so that it has no improper fraction.

5. $5\frac{2}{3}$
   $3\frac{2}{3}$
   ———
   $8\frac{4}{3}$

6. $1\frac{4}{6} + 8\frac{3}{6} = 9\frac{7}{6}$

7. $4\frac{1}{4} + 2\frac{3}{4} = 6\frac{4}{4}$

Add. Regroup the sum when it shows an improper fraction.

8. $1\frac{1}{5}$
   $3\frac{4}{5}$
   ———

9. $5\frac{5}{12} + 9\frac{2}{12}$

10. $4\frac{5}{9} + 4\frac{7}{9}$

Exercises

Add. Regroup the sum when it shows an improper fraction.

1. $\frac{7}{9}$
   $\frac{6}{9}$
   ———

2. $4\frac{1}{3}$
   $5\frac{2}{3}$
   ———

3. $1\frac{6}{8}$
   $2\frac{7}{8}$
   ———

4. $2\frac{1}{5}$
   $\frac{2}{5}$
   ———

5. $7\frac{7}{12}$
   $5\frac{5}{12}$
   ———

6. $4\frac{5}{6}$
   3
   ———

7. $\frac{11}{12} + \frac{6}{12}$

8. $3\frac{1}{2} + 7\frac{1}{2}$

9. $2\frac{3}{8} + 5\frac{6}{8}$

10. $1\frac{3}{9} + 5\frac{4}{9}$

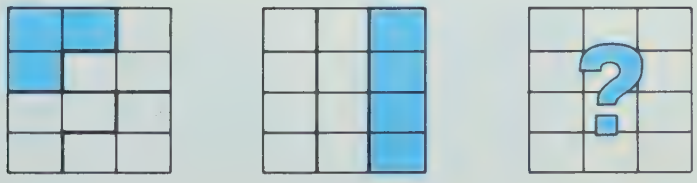
11. $1\frac{2}{7} + 10\frac{5}{7}$

12. $11\frac{7}{10} + 8\frac{6}{10}$

Solve.

13. Clark had $1\frac{1}{2}$ bags of groceries. Molly had $2\frac{1}{2}$ bags of groceries. How many full bags of groceries could they have in all?

14. The carpenter estimated that one job would take $1\frac{3}{4}$ workdays and the other job would take $2\frac{3}{4}$ workdays. How many workdays would both jobs take?



$\frac{1}{4}$ + $\frac{1}{3}$ = ▒

try this

1. How would you complete the picture?

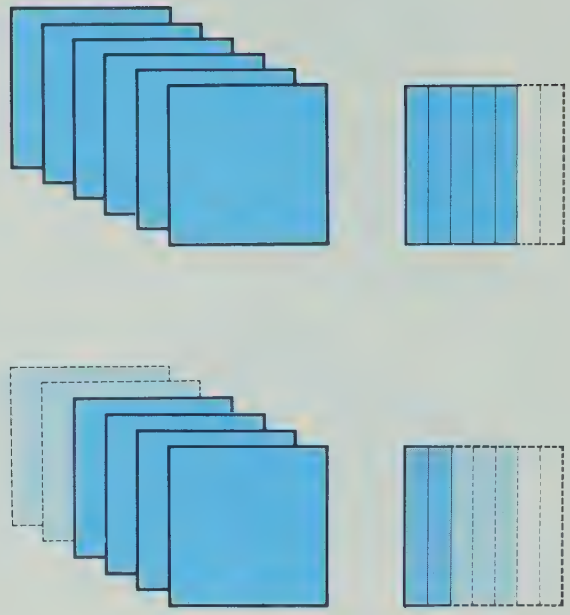
2. How would you complete the addition sentence?

Subtracting Fractions

Subtract $2\frac{3}{7}$ from $6\frac{5}{7}$.

Subtract sevenths.
Then subtract ones.

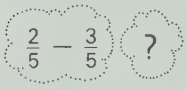
$$\begin{array}{r} 6\frac{5}{7} \\ 2\frac{3}{7} \\ \hline 4\frac{2}{7} \end{array}$$



$6\frac{5}{7} - 2\frac{3}{7} = 4\frac{2}{7}$

Subtract $1\frac{3}{5}$ from $4\frac{2}{5}$.

First, look at the fractions in the mixed numbers.

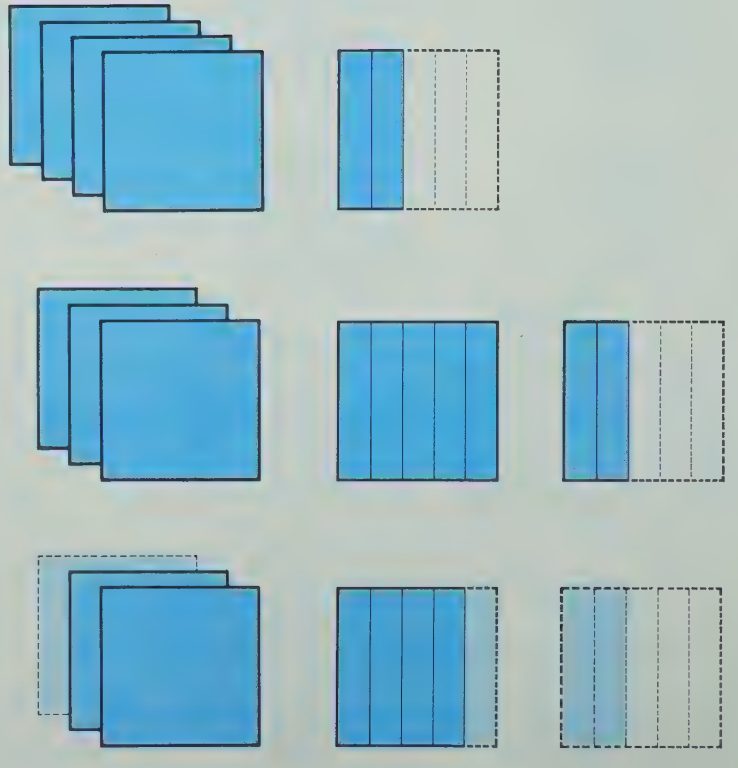


Then, regroup $4\frac{2}{5}$ as $3\frac{7}{5}$.

$$4\frac{2}{5} \text{ becomes } 3\frac{7}{5}$$

$$\begin{array}{r} 1\frac{3}{5} \\ \hline \end{array} \qquad \begin{array}{r} 1\frac{3}{5} \\ \hline 2\frac{4}{5} \end{array}$$

Next, subtract fifths. Then subtract ones.



$4\frac{2}{5} - 1\frac{3}{5} = 2\frac{4}{5}$

Working Together

Subtract the fractions. Then subtract the whole numbers.

1. $3\frac{4}{5}$
$1\frac{1}{5}$

2. $1\frac{7}{9} - \frac{2}{9}$

Regroup $4\frac{1}{8}$ as $3\frac{9}{8}$. Then subtract.

3. $4\frac{1}{8}$
$1\frac{7}{8}$

4. $4\frac{1}{8} - 3\frac{5}{8}$

Regroup 3 as 2 and a fraction. Then subtract.

5. 3
$1\frac{1}{4}$

6. $3 - \frac{5}{6}$

Subtract. Add to check.

7. $6\frac{1}{4}$
$3\frac{3}{4}$

8. $4\frac{2}{3} - 1\frac{1}{3}$

9. $7\frac{3}{10} - 4\frac{5}{10}$

Exercises

Subtract. Add to check.

1. $5\frac{1}{3}$
$2\frac{2}{3}$

2. $2\frac{1}{4}$
$\frac{3}{4}$

3. $8\frac{2}{7}$
$3\frac{5}{7}$

4. $4\frac{3}{6}$
$4\frac{1}{6}$

5. $6\frac{2}{9}$
$5\frac{4}{9}$

6. $2\frac{5}{12}$
$\frac{11}{12}$

7. $6\frac{3}{5} - 3\frac{4}{5}$

8. $5\frac{11}{12} - 1\frac{5}{12}$

9. $10\frac{5}{9} - 4\frac{8}{9}$

10. $6 - 5\frac{1}{2}$

11. $1\frac{1}{7} - \frac{6}{7}$

12. $12\frac{3}{8} - 9\frac{7}{8}$

13. $3\frac{4}{7} - 2$

14. $7\frac{1}{10} - 5\frac{7}{10}$

15. $10 - 7\frac{3}{12}$

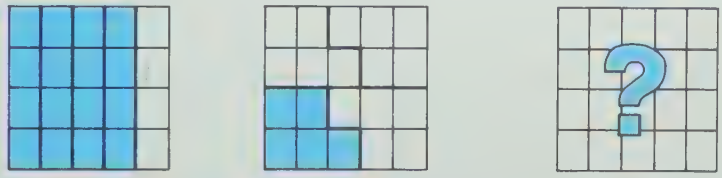
16. $7 - 4\frac{1}{5}$

17. $3\frac{7}{10} - 2\frac{9}{10}$

18. $9\frac{1}{4} - 7\frac{2}{4}$

19. $5\frac{1}{8}$ of 7 pies were eaten. How many pies are left?

20. $1\frac{2}{3}$ of 3 bags of nuts were eaten. How many bags are left?



$\frac{4}{5} - \frac{1}{4} =$ ▒

try this

1. How would you complete the picture?

2. How would you complete the subtraction sentence?

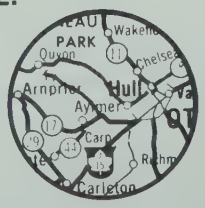
Practice

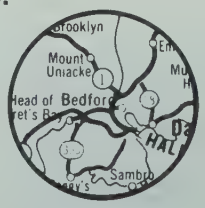
How well do you know your *geography*? Answer each question. Make a guess if you are not sure. Then use a map to help you check your work.

1. What fraction shows how many provinces have more than one word in their name?
2. For the name of each province, what fraction shows how many letters are vowels?
3. What fraction shows how many provinces share a land border with the United States?
4. What fraction shows how many provinces border on any of the five Great Lakes?
5. What fraction shows how many Great Lakes border on Canada?
6. What fraction shows how many provinces border on the Pacific Ocean?
7. What fraction shows how many provinces are west of Ontario?
8. What fraction shows how many provinces are islands?
9. There are three Maritime Provinces. What fraction shows how many of these are islands?
10. There are four Atlantic Provinces. What fraction shows how many of these are islands?

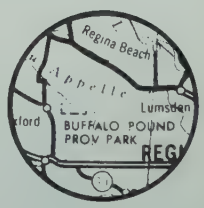
Can you find these on a map? Look for clues.

1.

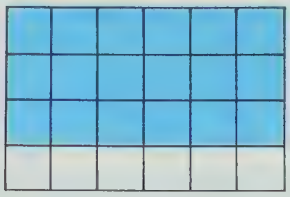
2. 

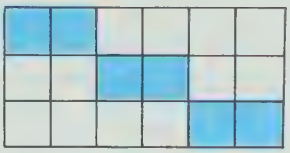
3. 

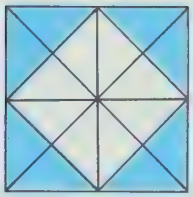
4.

5. 

Write two equivalent fractions for each picture.

11. 

12. 

13. 

Complete the equivalent fractions in each chart.

14.

$\frac{1}{4}$	$\frac{2}{\blacksquare}$	$\frac{\blacksquare}{12}$	$\frac{4}{\blacksquare}$	$\frac{\blacksquare}{20}$

15.

$\frac{\blacksquare}{3}$	$\frac{\blacksquare}{6}$	$\frac{6}{9}$	$\frac{8}{\blacksquare}$	$\frac{\blacksquare}{15}$

Find the missing term in each pair of equivalent fractions.

16. $\frac{3}{5} = \frac{\blacksquare}{10}$ **17.** $\frac{2}{4} = \frac{6}{\blacksquare}$ **18.** $\frac{7}{8} = \frac{\blacksquare}{32}$ **19.** $\frac{15}{36} = \frac{5}{\blacksquare}$ **20.** $\frac{2}{6} = \frac{\blacksquare}{9}$

Use >, <, or = to make true statements.

21. $\frac{5}{6} \bigcirc \frac{2}{3}$ **22.** $\frac{7}{10} \bigcirc \frac{3}{4}$ **23.** $\frac{6}{12} \bigcirc \frac{1}{2}$ **24.** $\frac{3}{7} \bigcirc \frac{4}{9}$ **25.** $\frac{5}{12} \bigcirc \frac{3}{8}$

Write each of these as an improper fraction.

26. $1\frac{3}{4}$ **27.** $7\frac{5}{8}$ **28.** $10\frac{4}{5}$

Write each of these as a number in mixed form.

29. $\frac{43}{5}$ **30.** $\frac{35}{12}$ **31.** $\frac{110}{9}$

Add.

32. $\frac{3}{8}$ + $\frac{2}{8}$ **33.** $5\frac{1}{7}$ + $\frac{3}{7}$ **34.** $3\frac{2}{3}$ + 2 **35.** $1\frac{5}{6}$ + $1\frac{5}{6}$

36. $2\frac{2}{3} + 1\frac{1}{3}$

37. $5\frac{2}{4} + 3\frac{3}{4}$

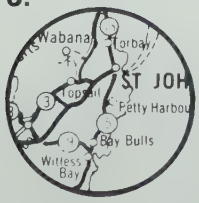
Subtract.

38. $\frac{4}{5}$ − $\frac{2}{5}$ **39.** $7\frac{1}{2}$ − $2\frac{1}{2}$ **40.** 3 − $1\frac{7}{10}$ **41.** $6\frac{2}{9}$ − $1\frac{8}{9}$

42. $4\frac{1}{3} - 3\frac{2}{3}$

43. $10\frac{3}{8} - 6\frac{5}{8}$

6.



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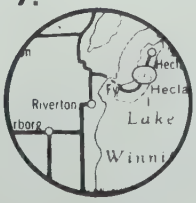
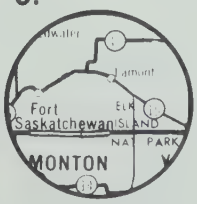


8.

9.



PROBLEM SOLVING

Another Look at Finding the Missing Term

There are 24 students in Bill's class.
He estimated that $\frac{3}{4}$ of them have brown eyes.
How many are there in $\frac{3}{4}$ of 24?

To find the missing term in $\frac{3}{4} = \frac{\blacksquare}{24}$,

divide 24 by 4

$$\frac{3}{4} \xrightarrow{4 \times \blacksquare} \frac{\blacksquare}{24}$$

6

to find this value.

Then multiply 6 by 3
to find this value.

$$\frac{3}{4} \xrightarrow{3 \times 6} \frac{18}{24}$$

$$\frac{3}{4} \xrightarrow{4 \times 6} \frac{18}{24}$$

OR

divide 24 by 4

$$4\overline{)24}^{\,6}$$

to find $\frac{1}{4}$ of 24.

Then multiply 6 by 3

$$3 \times 6 = 18$$

to find $\frac{3}{4}$ of 24.

There are 18 in $\frac{3}{4}$ of 24.

Working Together

Complete.

1. To find $\frac{1}{4}$ of a number, divide that number by ▒.

2. To find $\frac{1}{7}$ of a number, divide that number by ▒.

Find each of these.

3. $\frac{1}{3}$ of 18 **4.** $\frac{1}{8}$ of 56 **5.** $\frac{1}{6}$ of 36 **6.** $\frac{1}{2}$ of 32

Complete.

7. To find $\frac{3}{4}$ of a number, divide that number by ▒ and then multiply by ▒.

8. To find $\frac{7}{12}$ of a number, divide that number by ▒ and then multiply by ▒.

Find each of these.

9. $\frac{2}{3}$ of 15 **10.** $\frac{4}{7}$ of 42 **11.** $\frac{2}{5}$ of 65 **12.** $\frac{7}{10}$ of 80

Exercises

Find each of these.

1. $\frac{1}{5}$ of 40 **2.** $\frac{1}{9}$ of 36 **3.** $\frac{1}{10}$ of 100 **4.** $\frac{1}{7}$ of 84 **5.** $\frac{1}{12}$ of 72

6. $\frac{3}{4}$ of 16 **7.** $\frac{2}{7}$ of 28 **8.** $\frac{7}{8}$ of 32 **9.** $\frac{4}{5}$ of 30 **10.** $\frac{2}{9}$ of 81

11. $\frac{5}{7}$ of 49 **12.** $\frac{3}{10}$ of 230 **13.** $\frac{7}{9}$ of 135 **14.** $\frac{3}{8}$ of 96 **15.** $\frac{7}{12}$ of 312

There are 24 students in the class.

16. Gail estimated that $\frac{1}{2}$ of them have brown eyes. How many are there in $\frac{1}{2}$ of 24?

17. Mel estimated that $\frac{2}{3}$ of them have brown eyes. How many are there in $\frac{2}{3}$ of 24?

18. Ned estimated that $\frac{1}{6}$ of them have blue eyes. How many are there in $\frac{1}{6}$ of 24?

19. Connie estimated that $\frac{5}{8}$ of them have eye color that is not blue. How many are there in $\frac{5}{8}$ of 24?

Use division for each of these. Write the quotient and remainder as a number in mixed form.

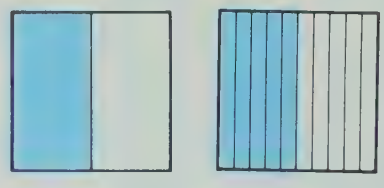
Example: For $\frac{1}{5}$ of 17, use $5\overline{)17}$ $\quad 3\ \text{R}2$

Write "$\frac{1}{5}$ of 17 is $3\frac{2}{5}$".

20. Find $\frac{1}{3}$ of 14. **21.** Find $\frac{1}{12}$ of 113.

Equivalent Fractions and Decimals

The fraction $\frac{1}{2}$ is equivalent to the decimal 0.5.

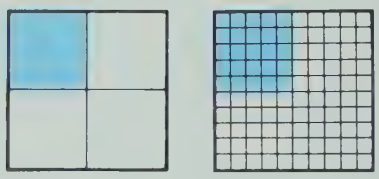


$$\frac{1}{2} = \frac{5}{10} \text{ or } 0.5$$

(1 × 5 and 2 × 5)

A factor of 5 will change halves to tenths.

The fraction $\frac{1}{4}$ is equivalent to the decimal 0.25.

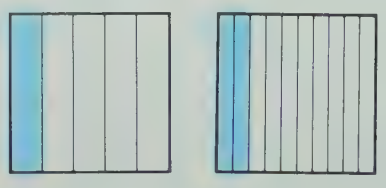


$$\frac{1}{4} = \frac{25}{100} \text{ or } 0.25$$

(1 × 25 and 4 × 25)

A factor of 25 will change fourths to hundredths.

The fraction $\frac{1}{5}$ is equivalent to the decimal 0.2.



$$\frac{1}{5} = \frac{2}{10} \text{ or } 0.2$$

(1 × 2 and 5 × 2)

A factor of 2 will change fifths to tenths.

Working Together

Complete.

1. $\frac{3}{4} = \frac{\blacksquare}{100}$ or the decimal 0.75.
2. $\frac{2}{5} = \frac{\blacksquare}{10}$ or the decimal ▒.
3. $1\frac{1}{2} = 1\frac{\blacksquare}{10}$ or the decimal ▒.

Give a decimal that is equivalent to each of these.

4. $\frac{4}{5}$
5. $\frac{2}{4}$
6. $4\frac{1}{4}$
7. $3\frac{3}{5}$

Exercises

Write a decimal that is equivalent to each of these.

1. $\frac{3}{5}$
2. $3\frac{1}{10}$
3. $\frac{3}{4}$
4. $2\frac{1}{4}$
5. $5\frac{1}{2}$
6. $\frac{3}{10}$
7. $7\frac{3}{4}$
8. $1\frac{4}{5}$
9. $6\frac{5}{10}$
10. $2\frac{1}{5}$
11. $\frac{1}{2}$
12. $3\frac{2}{5}$
13. $1\frac{2}{4}$
14. $\frac{1}{5}$
15. $\frac{7}{10}$

*16. $\frac{1}{8}$
*17. $\frac{3}{8}$
*18. $1\frac{5}{8}$

For each situation, write a sentence that uses a decimal.

19. Mandy lives 1 km from the store. She walked a fourth of the way home and rode the rest of the way with a neighbor.
20. Mandy bought a carton holding 1 L of milk. She drank half of the milk from the carton.

*21. Mandy bought 1 kg of ground beef. She used about $\frac{1}{8}$ of it for a hamburger.

Divide. Use as many zeros as you need in the dividend.

1. $2\overline{)23.1}$
2. $8\overline{)16.12}$
3. $4\overline{)17.2}$
4. $5\overline{)38.1}$
5. $6\overline{)1.5}$
6. $10\overline{)12.3}$
7. $8\overline{)60.8}$
8. $2\overline{)8.11}$
9. $5\overline{)2}$
10. $4\overline{)3}$
11. $12\overline{)9}$
12. $10\overline{)7}$
13. $2\overline{)19}$
14. $8\overline{)13}$
15. $10\overline{)37}$

Example:

$$\begin{array}{r} 5.75 \\ 4\overline{)23.00} \\ \underline{20} \\ 30 \\ \underline{28} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

KEEPING SHARP

Changing Fractions to Decimals by Dividing

Each quarter is $\frac{1}{4}$ of a dollar.

27 quarters are $\frac{27}{4}$ dollars.

To change $\frac{27}{4}$ to show whole dollars

divide and show the number in mixed form,

$$\begin{array}{r} 6 \\ 4\overline{)27} \\ \underline{24} \\ 3 \end{array}$$

6 whole dollars

$6\frac{3}{4}$ dollars

3 quarters of another dollar

OR

divide and show a decimal.

$$\begin{array}{r} 6.75 \\ 4\overline{)27.00} \\ \underline{24} \\ 30 \\ \underline{28} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

$\frac{27}{4}$ dollars is the same as $6\frac{3}{4}$ dollars.

$\frac{27}{4}$ dollars is the same as 6.75 dollars or \$6.75.

Here are other divisions that show how to change a fraction to a decimal.

Always divide the numerator by the denominator.

For $\frac{1}{2}$,

$$\begin{array}{r} 0.5 \\ 2\overline{)1.0} \\ \underline{10} \\ 0 \end{array}$$

$\frac{1}{2} = 0.5$

For $\frac{1}{8}$,

$$\begin{array}{r} 0.125 \\ 8\overline{)1.000} \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

$\frac{1}{8} = 0.125$

For $\frac{81}{12}$,

$$\begin{array}{r} 6.75 \\ 12\overline{)81.00} \\ \underline{72} \\ 90 \\ \underline{84} \\ 60 \\ \underline{60} \\ 0 \end{array}$$

$\frac{81}{12} = 6.75$

Exercises

Karen opened her bank. She counted 234 pennies, 163 nickels, 177 dimes, 53 quarters, and 19 fifty-cent coins.

Use division to find how much Karen's coins are worth.

1. Each penny is $\frac{1}{100}$ of a dollar. 234 pennies are $\frac{234}{100}$ dollars. How much are 234 pennies worth?

2. Each nickel is $\frac{1}{20}$ of a dollar. 163 nickels are $\frac{163}{20}$ dollars. How much are 163 nickels worth?

3. Each dime is $\frac{1}{10}$ of a dollar. 177 dimes are $\frac{177}{10}$ dollars. How much are 177 dimes worth?

4. Each quarter is $\frac{1}{4}$ of a dollar. 53 quarters are $\frac{53}{4}$ dollars. How much are 53 quarters worth?

5. Each fifty-cent coin is $\frac{1}{2}$ of a dollar. 19 fifty-cent coins are $\frac{19}{2}$ dollars. How much are 19 fifty-cent coins worth?

6. Karen's goal is $100 for a new bicycle. Is she halfway to her goal yet?

Divide the numerator by the denominator to change each fraction to a decimal. Use as many zeros in the dividend as you need.

7. $\frac{7}{2}$	**8.** $\frac{3}{4}$	**9.** $\frac{23}{10}$	**10.** $\frac{3}{5}$	**11.** $\frac{17}{4}$	**12.** $\frac{1}{8}$
13. $\frac{58}{10}$	**14.** $\frac{4}{5}$	**15.** $\frac{1}{2}$	**16.** $\frac{227}{4}$	**17.** $\frac{1}{5}$	**18.** $\frac{7}{8}$
19. $\frac{1}{4}$	**20.** $\frac{38}{5}$	**21.** $\frac{5}{8}$	**22.** $\frac{2}{5}$	**23.** $\frac{60}{8}$	**24.** $\frac{3}{8}$

Using Decimals to Work with Fractions

Each carton of milk can hold 1 L of milk. One carton is $\frac{2}{5}$ full. The other is $\frac{3}{8}$ full. Which carton has more milk? How much milk is there in the two cartons?

$\frac{2}{5} = 0.4$

$\frac{3}{8} = 0.375$

$0.4 > 0.375$, so

$\frac{2}{5} > \frac{3}{8}$

The carton that is $\frac{2}{5}$ full has more milk.

Add.
$$\begin{array}{r} 0.4\bigcirc\bigcirc \\ \underline{0.375} \\ 0.775 \end{array}$$

There are 0.775 L of milk in the two cartons.

0.775 is a little greater than 0.75◌.

$0.75 = \frac{3}{4}$

If all the milk could be poured into one carton, that carton would be a little more than $\frac{3}{4}$ full.

Exercises

Will >, <, or = make the statement true?
Use decimals to help you decide.

1. $\frac{3}{5}$ ◯ $\frac{5}{8}$ **2.** $\frac{9}{10}$ ◯ $\frac{7}{8}$ **3.** $\frac{11}{4}$ ◯ $\frac{14}{5}$ **4.** $\frac{18}{5}$ ◯ $\frac{36}{10}$

5. $\frac{36}{5}$ ◯ $\frac{29}{4}$ **6.** $\frac{12}{8}$ ◯ $\frac{15}{10}$ **7.** $\frac{54}{5}$ ◯ $\frac{86}{8}$ **8.** $\frac{30}{4}$ ◯ $\frac{61}{8}$

Add the fractions. Then add the equivalent decimals. Compare the sums.

9. $1\frac{3}{4}$ + $2\frac{2}{4}$ **10.** $4\frac{7}{8}$ + $7\frac{5}{8}$ **11.** $8\frac{3}{5}$ + $1\frac{4}{5}$ **12.** $3\frac{7}{10}$ + $5\frac{5}{10}$

13. $7\frac{1}{2}$ + $2\frac{1}{2}$ **14.** $9\frac{3}{8}$ + $6\frac{6}{8}$ **15.** $3\frac{2}{5}$ + $1\frac{3}{5}$ **16.** $10\frac{3}{4}$ + $9\frac{3}{4}$

Subtract the fractions. Then subtract the equivalent decimals. Compare the differences.

17. $4\frac{1}{10}$ − $2\frac{7}{10}$ **18.** 2 − $1\frac{1}{2}$ **19.** $8\frac{3}{8}$ − $3\frac{7}{8}$ **20.** $10\frac{1}{4}$ − $6\frac{2}{4}$

21. $1\frac{2}{5}$ − $\frac{4}{5}$ **22.** $3\frac{5}{8}$ − $3\frac{1}{8}$ **23.** $6\frac{1}{4}$ − $1\frac{3}{4}$ **24.** $12\frac{1}{5}$ − $7\frac{2}{5}$

Use the equivalent decimals to find each sum or difference. Give a fraction that is equivalent, or almost equivalent, to your decimal result.

***25.** $1\frac{1}{2} + 1\frac{3}{4}$ ***26.** $2\frac{1}{4} - 1\frac{1}{2}$

***27.** $3\frac{1}{4} + \frac{5}{8}$ ***28.** $1\frac{1}{8} - \frac{3}{4}$

***29.** $\frac{4}{5} + \frac{3}{4}$ ***30.** $1\frac{7}{8} - \frac{2}{5}$

How many times will the minute hand of a clock be directly over the hour hand in 24 h?

PROBLEM SOLVING

Choosing the Information Needed

Sometimes a problem gives more information than is needed.

Byron is 148.4 cm tall. Last year he was 140.5 cm tall. Last year Sandra was 147.7 cm tall. Now she is 153.2 cm tall. Who is taller now? How much taller?

Here is the information needed.

Byron is 148.4 cm tall.
Sandra is 153.2 cm tall.

Here is the solution.

153.2 - 148.4 = 4.8
Sandra is 4.8 cm taller.

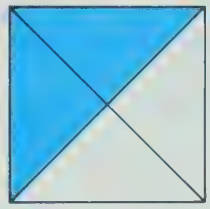
For each problem, copy only the information you need. Then solve the problem.

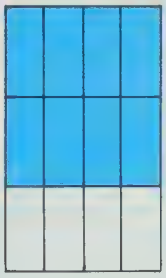
1. Rosalie was 145.6 cm tall last year. Now she is 3.7 cm taller. Blake is 6.2 cm taller than he was last year when he was 143.8 cm tall. Who was taller last year? How much taller?
2. Last year Eva was 146.2 cm tall. Since then she has grown 5.9 cm. Irv has grown 8.1 cm since last year. Now he is 151.2 cm tall. Who has grown more since last year? How much more?
3. Julius has grown 6.8 cm since last year when he was 144.5 cm tall. Nora has grown 5.3 cm since last year and now is 147.6 cm tall. Who is taller now? How much taller?
4. Last year Ben was 140.3 cm tall and Phyllis was 141.5 cm tall. This year Phyllis is 145.3 cm tall and Ben is 148.0 cm tall. Since last year who has grown more? How much more?
5. Last year Gil was 149.7 cm tall and Chip was 147.1 cm tall. Since then Chip has grown 2.0 cm more than Gil and now is just 0.6 cm shorter than Gil. Gil is 155.5 cm tall now. How much has Gil grown since last year?
6. Last year when she was 148.7 cm tall, Jo was 4.8 cm taller than Sue. Jo has grown 4.6 cm and Sue has grown 7.8 cm since then. Now who is taller? How much taller?
7. Lyn is 153.4 cm tall, which is 4.3 cm taller than Joy. Last year Lyn was 146.5 cm tall. Since then she has grown 1.7 cm more than Joy. Joy was 2.6 cm shorter than Lyn last year but has grown 5.2 cm since then. Lyn has grown 6.9 cm this past year. Now Joy is 149.1 cm tall. How tall was Joy last year?

PROBLEM SOLVING

Checking Up

Write two equivalent fractions for each picture.

1. 

2. 

Write two fractions that are equivalent to each of these.

3. $\frac{3}{5}$

4. $\frac{7}{8}$

5. $\frac{6}{18}$

6. $\frac{9}{12}$

Find the missing term in each pair of equivalent fractions.

7. $\frac{1}{5} = \frac{\blacksquare}{35}$

8. $\frac{5}{6} = \frac{15}{\blacksquare}$

9. $\frac{2}{9} = \frac{\blacksquare}{36}$

10. $\frac{7}{12} = \frac{35}{\blacksquare}$

Use $>$, $<$, or $=$ to make true statements.

11. $\frac{4}{5} \bigcirc \frac{2}{5}$

12. $\frac{5}{8} \bigcirc \frac{3}{5}$

13. $\frac{4}{6} \bigcirc \frac{6}{9}$

14. $\frac{3}{7} \bigcirc \frac{5}{12}$

Write each of these as an improper fraction.

15. $5\frac{1}{2}$

16. $2\frac{2}{3}$

17. $4\frac{7}{8}$

18. $1\frac{5}{12}$

Write each of these as a number in mixed form.

19. $\frac{11}{4}$

20. $\frac{31}{5}$

21. $\frac{13}{9}$

22. $\frac{55}{10}$

Write each of these as a decimal.

23. $\frac{3}{4}$

24. $\frac{2}{5}$

25. $\frac{5}{8}$

26. $\frac{25}{4}$

Add.

27. $2\frac{1}{5}$
$\underline{4\frac{3}{5}}$

28. $1\frac{3}{4}$
$\underline{2\frac{3}{4}}$

29. $5\frac{5}{8}$
$\underline{3\frac{7}{8}}$

30. $6\frac{4}{10} + 5\frac{6}{10}$

31. $3\frac{7}{12} + 6\frac{9}{12}$

Subtract.

32. $3\frac{5}{7}$
$\underline{1\frac{2}{7}}$

33. 5
$\underline{2\frac{5}{6}}$

34. $8\frac{1}{3}$
$\underline{4\frac{2}{3}}$

35. $6\frac{3}{8} - 1\frac{7}{8}$

36. $10\frac{7}{9} - 4\frac{8}{9}$

Find each of these.

37. $\frac{1}{6}$ of 42

38. $\frac{2}{3}$ of 15

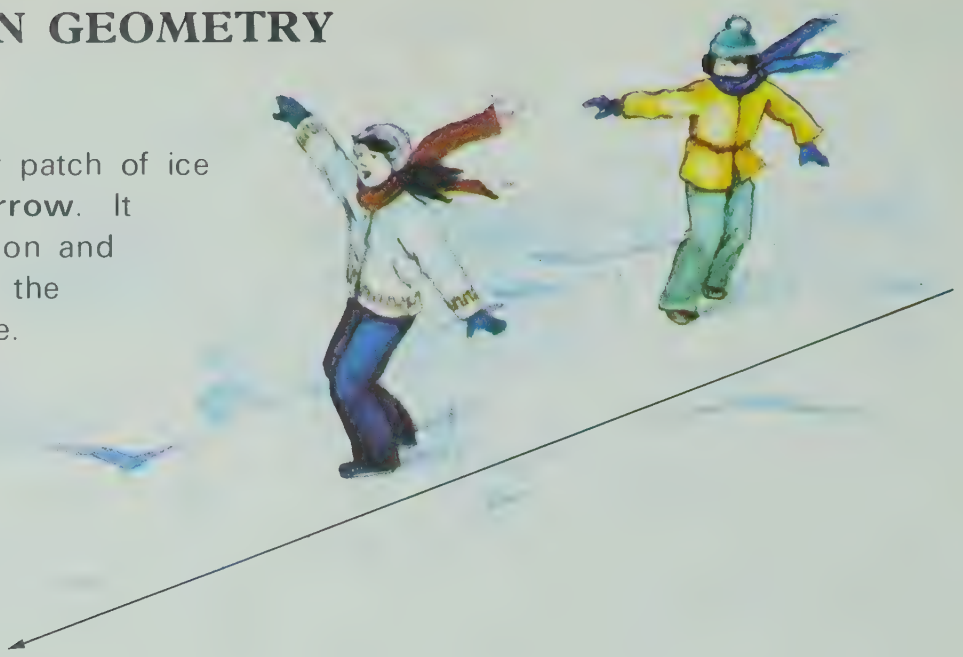
39. $\frac{3}{7}$ of 56

40. $\frac{7}{12}$ of 60

14 MOTION GEOMETRY

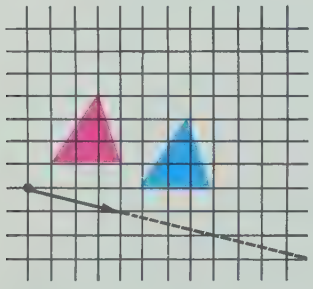
Slides

The long, narrow patch of ice is like a **slide arrow**. It shows the direction and the distance that the children can slide.

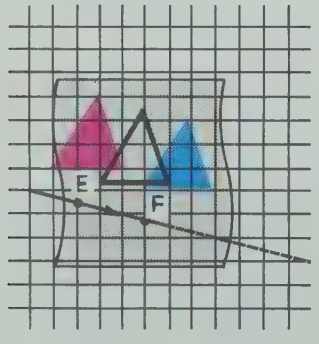


Working Together

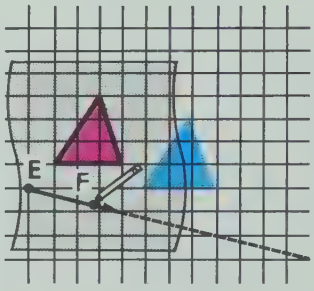
Use graph paper. Copy the two shapes and the slide arrow. Then extend the slide arrow.



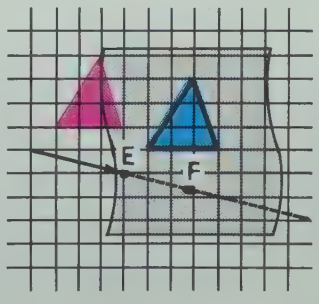
Slide the tracing so that points E and F move along the path of the slide arrow until . . .



Place tracing paper on your drawing. Trace the red shape and mark points E and F as shown.



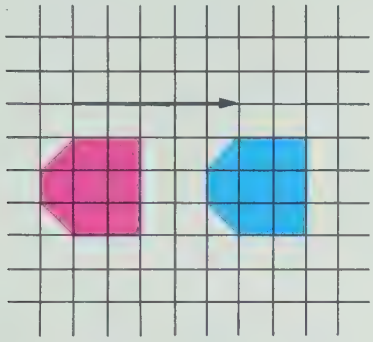
. . . point E is on the tip of the arrow. The tracing of the red shape matches the blue shape. The blue shape is the **slide image** of the red shape.

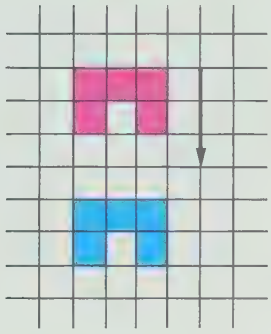


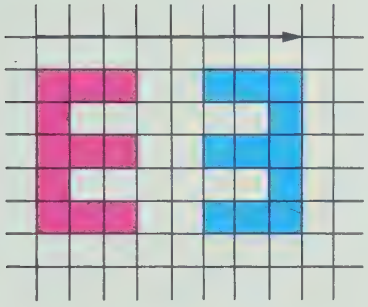
Exercises

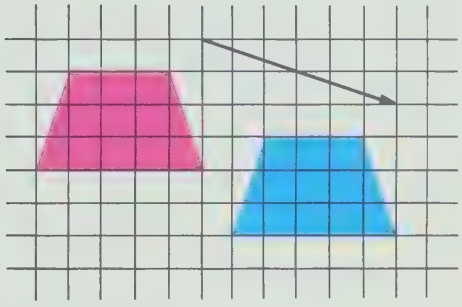
Copy the two shapes and the slide arrow on graph paper. Then use tracing paper to test whether the blue shape is the slide image of the red shape for the slide arrow shown.

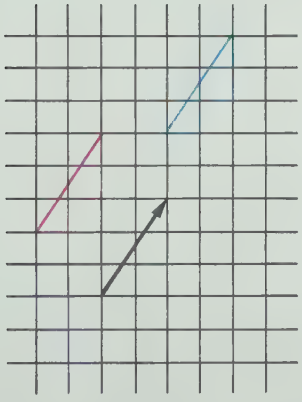
The slide arrow shows the direction and distance.

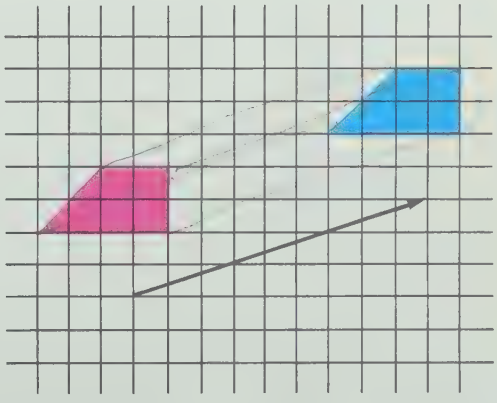
1. 

2. 

3. 

4. 

5. 

6. 

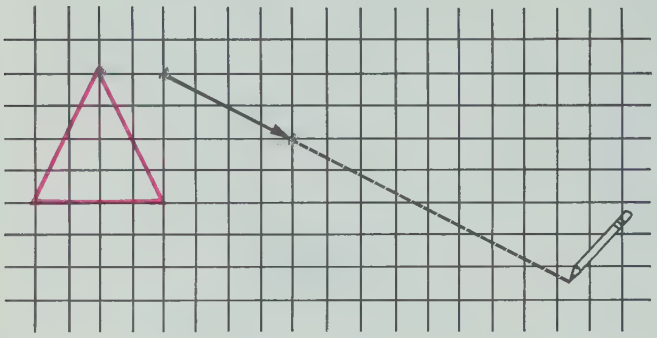
Use graph paper.

*7. Draw two congruent shapes and a slide arrow. Have a friend use tracing paper to tell whether one is the slide image of the other.

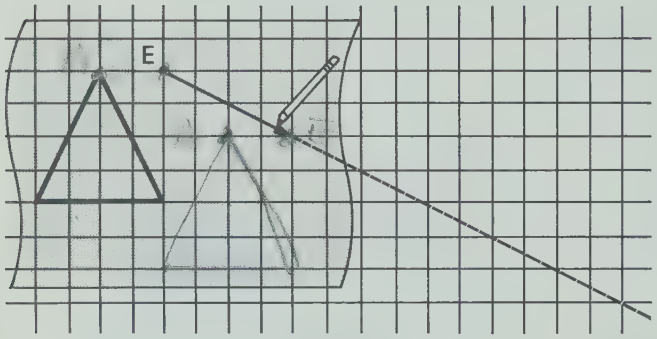
Congruent means same size and shape.

Drawing Slide Images

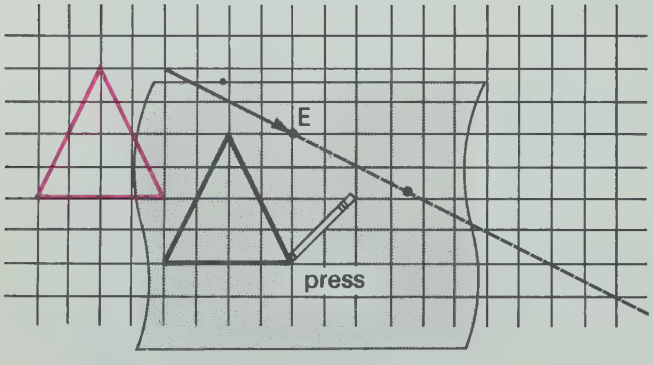
Draw the slide image of the triangle for the slide arrow shown.



Extend the slide arrow.

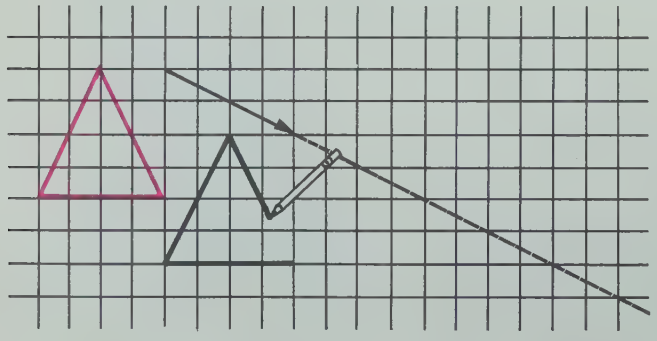


Use tracing paper. Copy the triangle. Mark the end point (E) and one other point of the slide arrow.



Slide the tracing so the two points move along the path of the slide arrow. Stop when the end point has moved to the tip of the arrow.

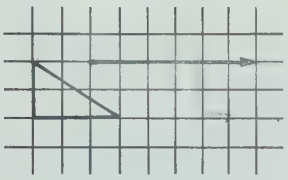
Mark the vertices with a pin or a sharp pencil.

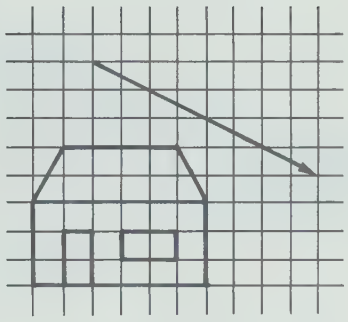


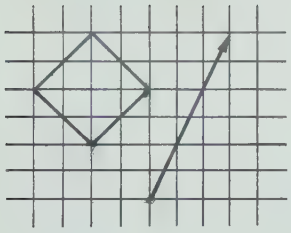
Remove the tracing paper and draw the slide image.

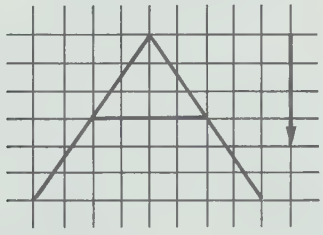
Exercises

Copy each shape and the slide arrow on graph paper.
Use tracing paper to help you draw the slide image
of the shape for the slide arrow shown.

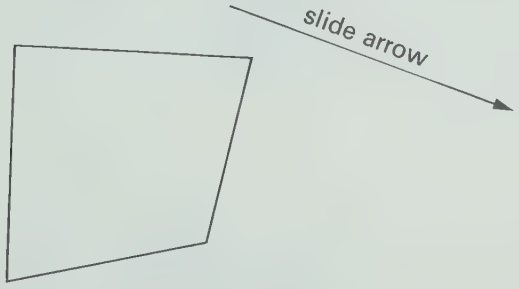
1. 

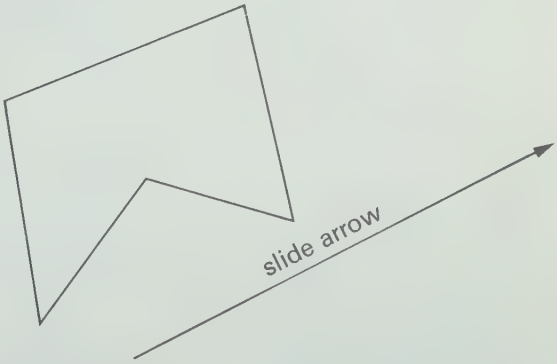
2. 

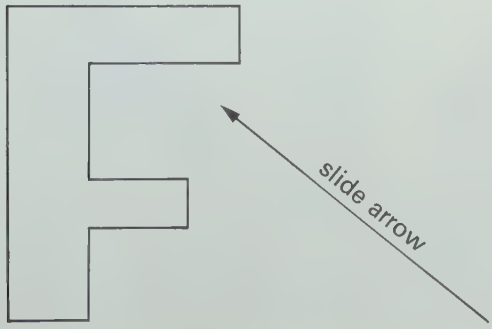
3. 

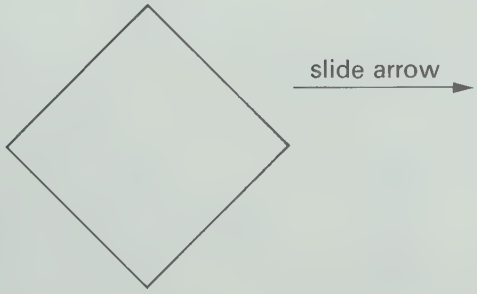
4. 

Copy each shape and the slide arrow on plain paper.
Use tracing paper to help you draw the slide image
of the shape.

5. 

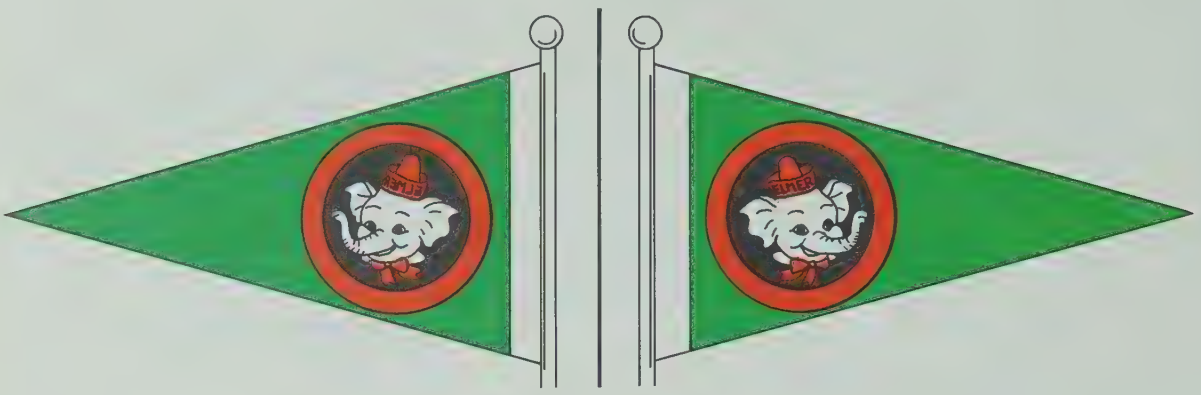
6. 

7. 

8. 

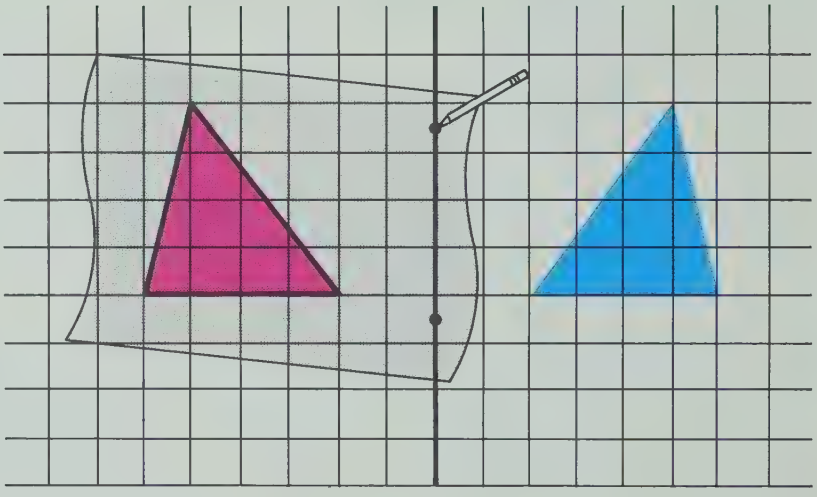
Flips

The flag in a west wind is the **flip image** of itself in an east wind.



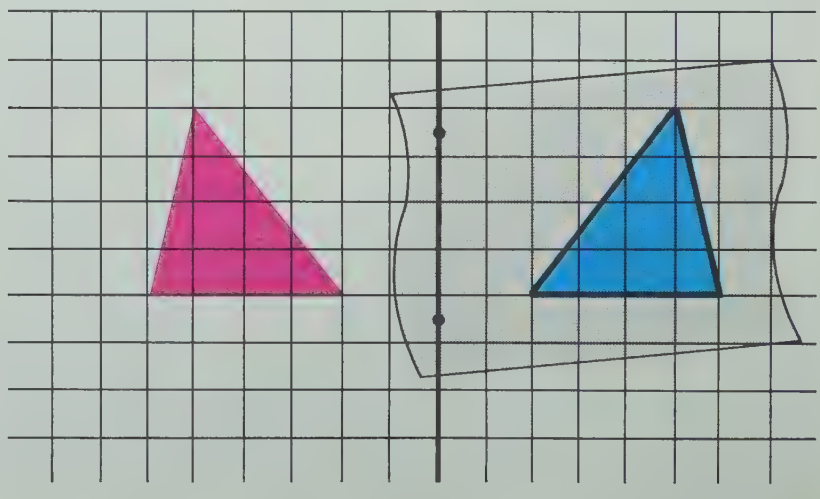
Working Together

Use tracing paper. Trace the red shape and the two points shown on the **flip line**.



Flip the tracing over. Match the two points on the tracing with those on the flip line.

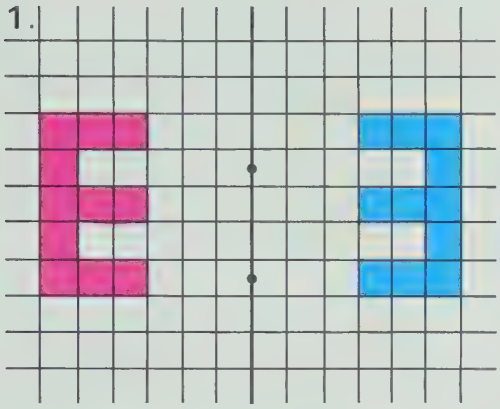
The tracing of the red shape matches the blue shape. The blue shape is the flip image of the red shape.



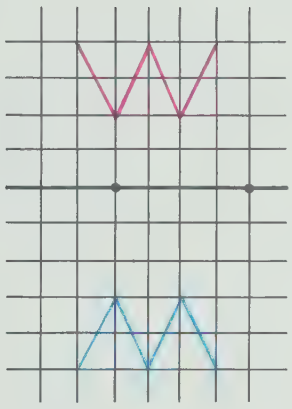
Exercises

Copy each picture on graph paper. Use tracing paper to test whether the blue shape is the flip image of the red shape for the flip line shown.

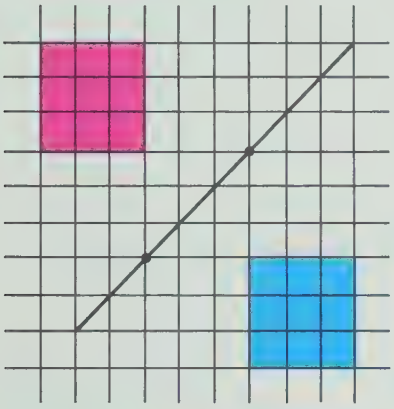
1.



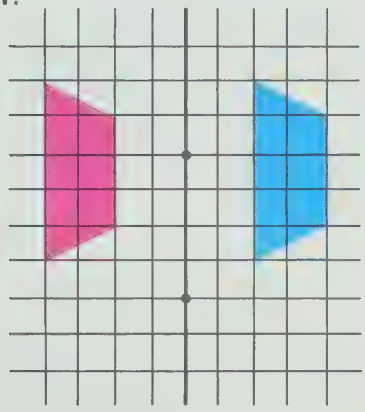
2.



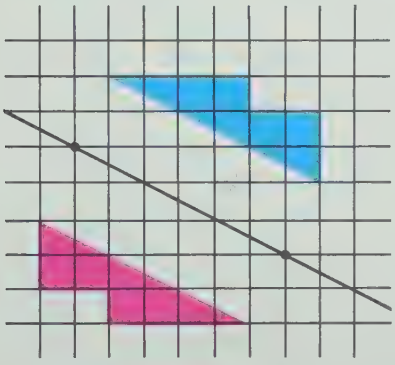
3.



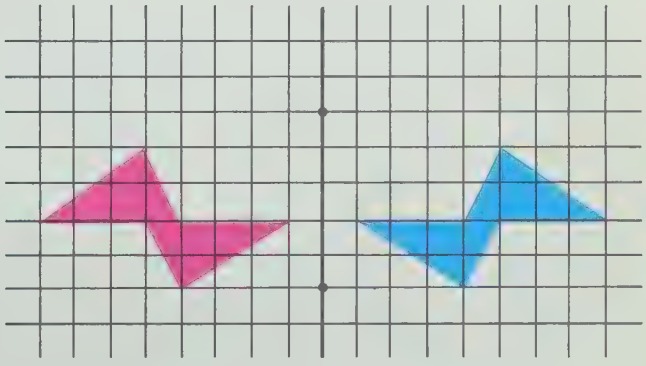
4.



5.



6.

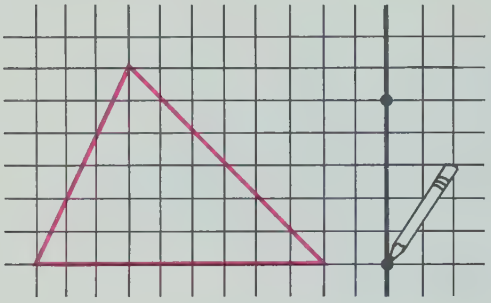


Use graph paper.

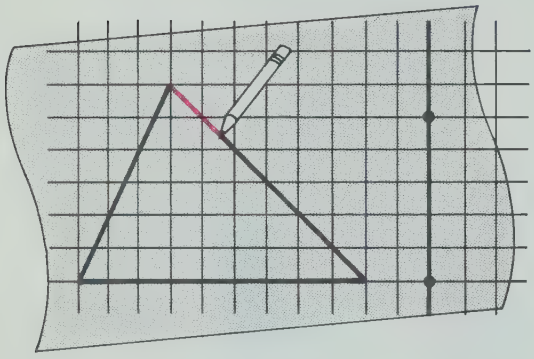
*7. Draw two congruent shapes and a flip line. Have a friend use tracing paper to tell whether one is the flip image of the other.

Drawing Flip Images

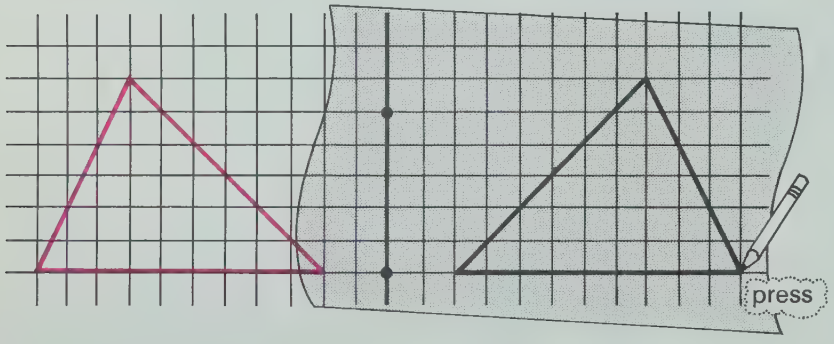
Draw the flip image of the triangle for the flip line shown.



Mark two points on the flip line.

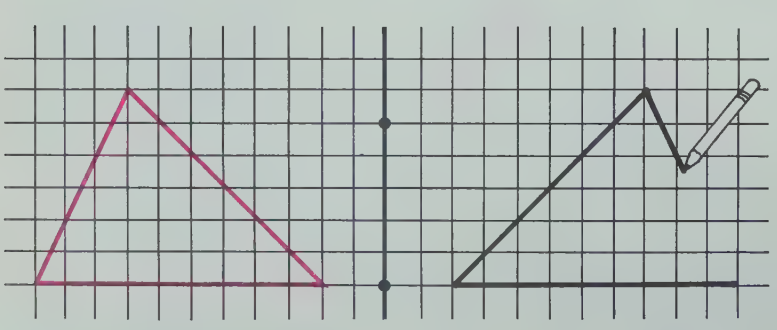


Use tracing paper.
Copy the two points on the flip line.
Copy the triangle.



Flip the tracing over. Match the two points on the tracing with those on the flip line.

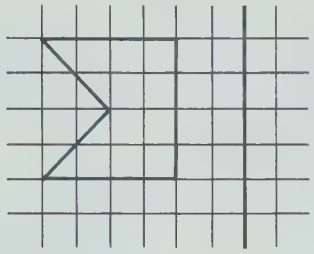
Mark the vertices with a pin or a sharp pencil.

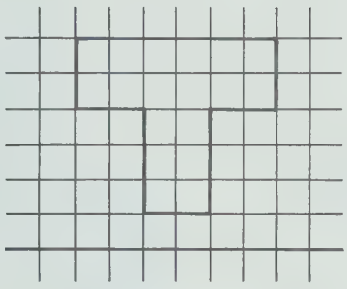


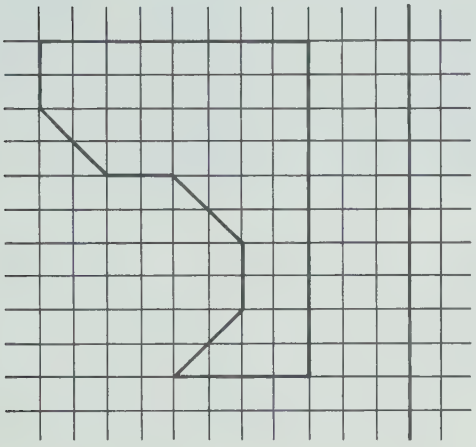
Remove the tracing paper and draw the flip image.

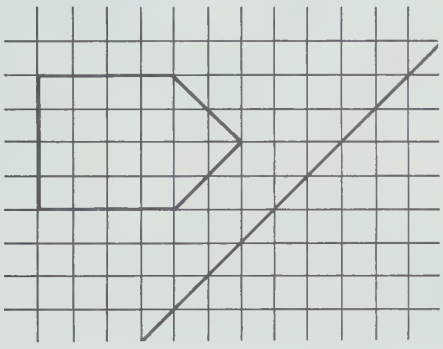
Exercises

Copy each shape and the flip line on graph paper. Use tracing paper to help you draw the flip image of the shape for the flip line shown.

1. 

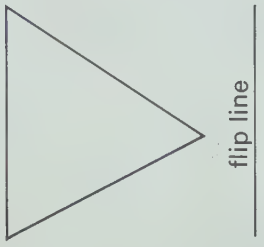
2. 

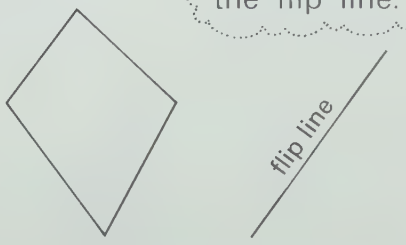
3. 

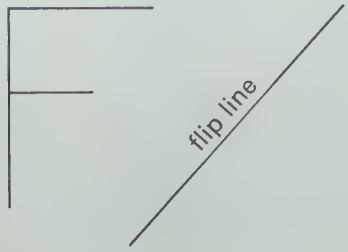
4. 

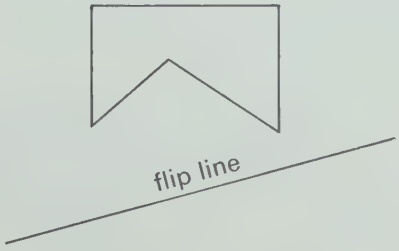
Copy each shape and the flip line on plain paper. Use tracing paper to help you draw the flip image of the shape.

Remember to mark two points on the flip line.

5. 

6. 

7. 

8. 

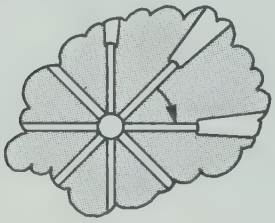
Turns

Each sail of the toy windmill is a **turn image** of the other sails.

The hole *through*

is the **turn centre**.

Two arms of the windmill suggest a **turn angle**. The turn centre is its vertex.



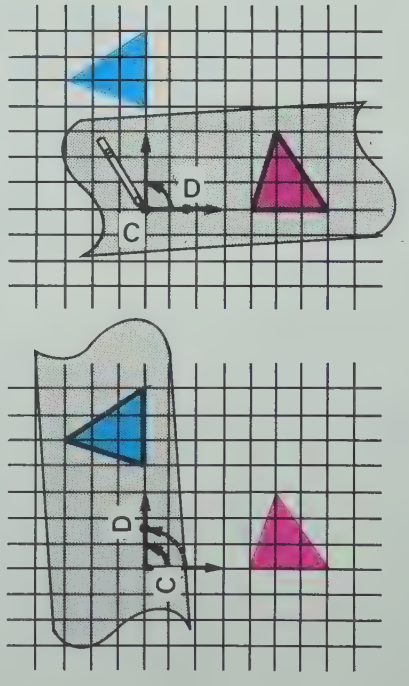
A turn angle shows how much a shape turns about the turn centre to go from one position to the next.

Working Together

Use tracing paper. Trace the red shape and mark points C (turn centre) and D as shown.

Turn the tracing about point C until point D is on the other ray of the turn angle.

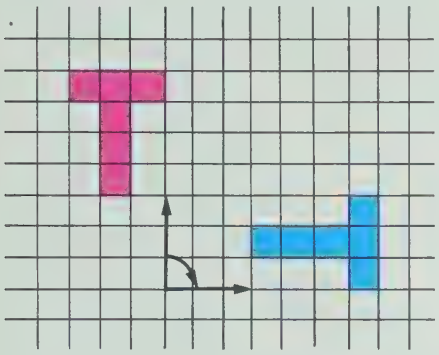
The tracing of the red shape matches the blue shape. The blue shape is the turn image of the red shape.



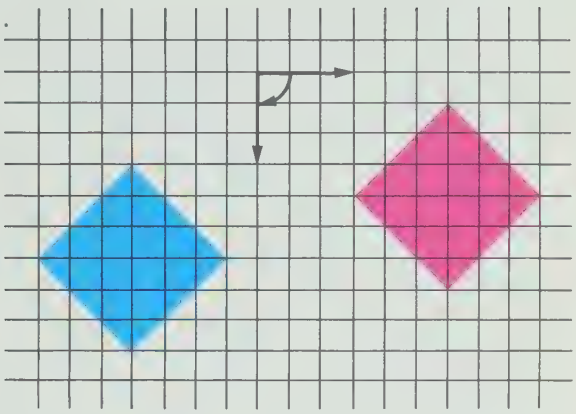
Exercises

Copy each picture on graph paper. Use tracing paper to test whether the blue shape is the turn image of the red shape for the turn angle shown.

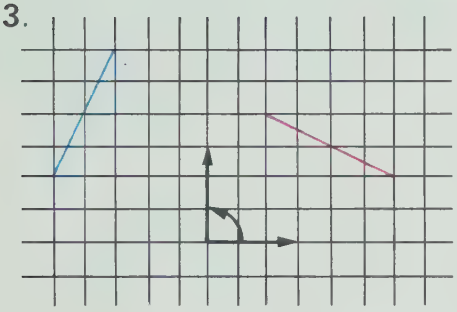
1.



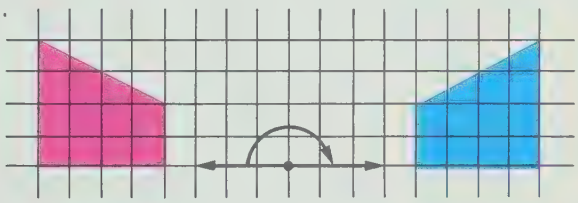
2.



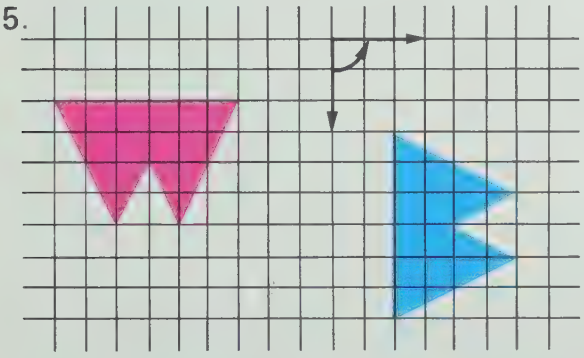
3.



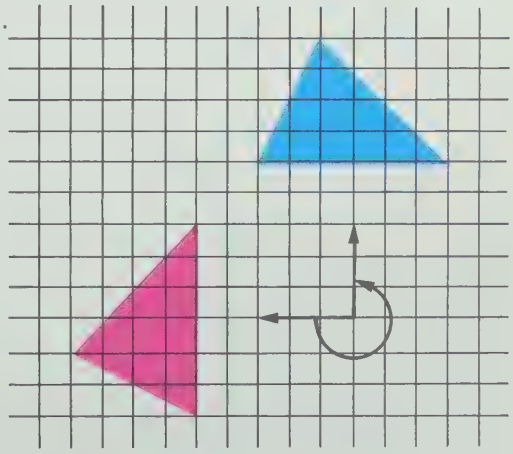
4.



5.



6.

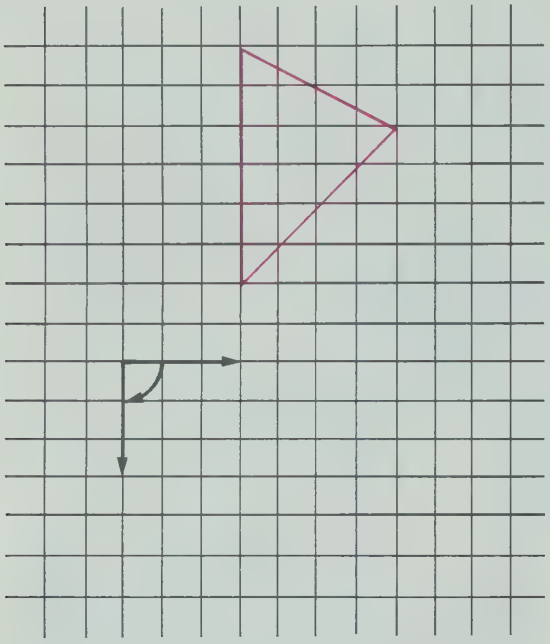


Use graph paper.

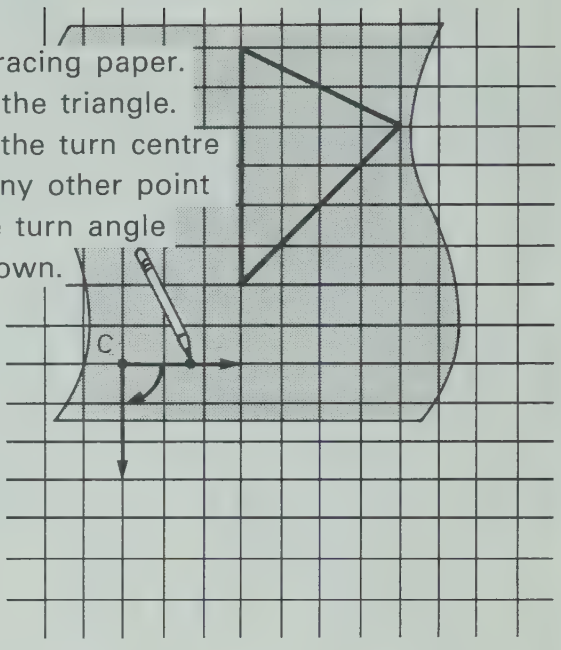
*7. Draw two congruent shapes and a turn angle. Have a friend use tracing paper to tell whether one is the turn image of the other.

Drawing Turn Images

Draw the turn image of the triangle for the turn angle shown.

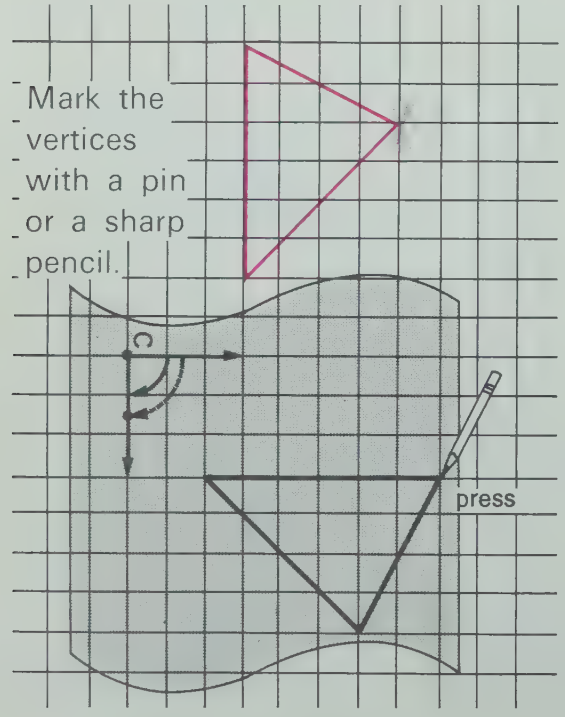


Use tracing paper.
Copy the triangle.
Mark the turn centre and any other point of the turn angle as shown.

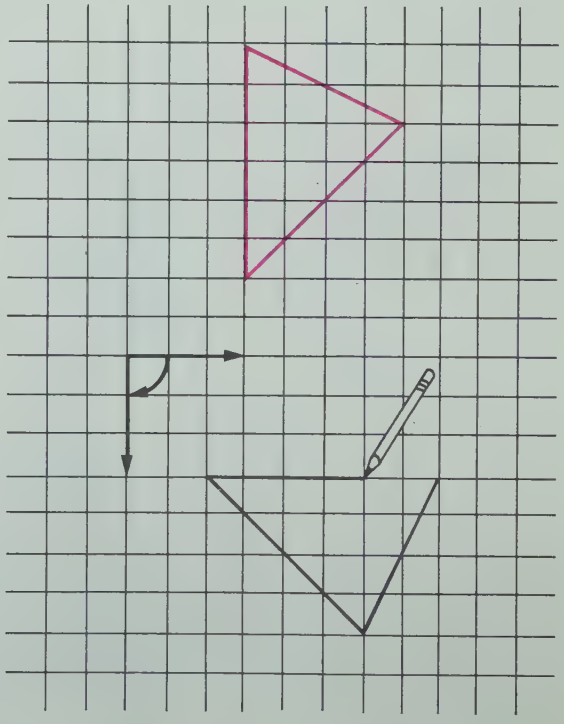


Turn the tracing about the turn centre. Stop when the other point is on the other ray of the turn angle.

Mark the vertices with a pin or a sharp pencil.

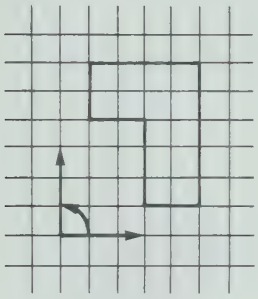


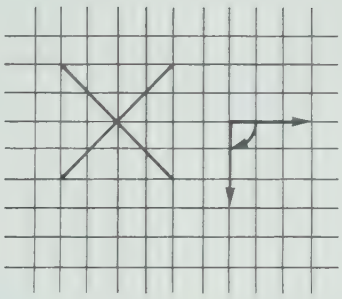
Remove the tracing paper and draw the turn image.

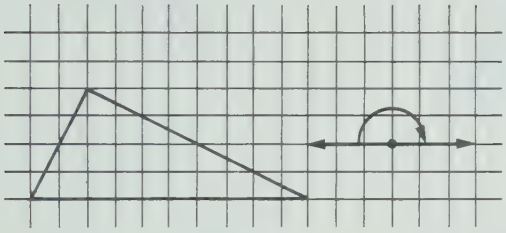


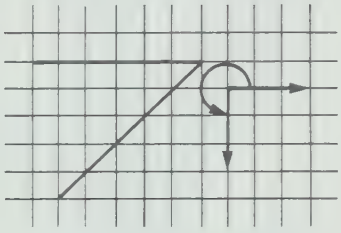
Exercises

Copy each shape and the turn angle on graph paper.
Use tracing paper to help you draw the turn image
of the shape for the turn angle shown.

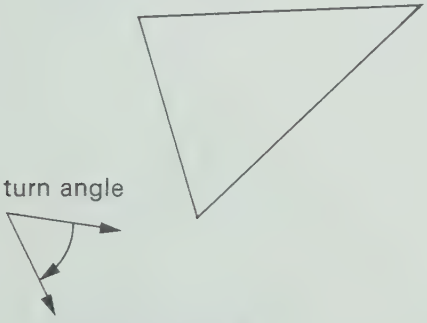
1. 

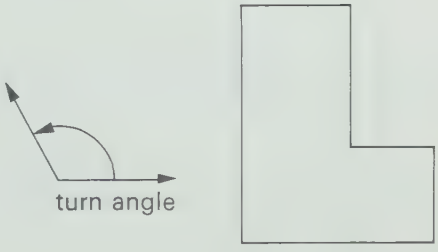
2. 

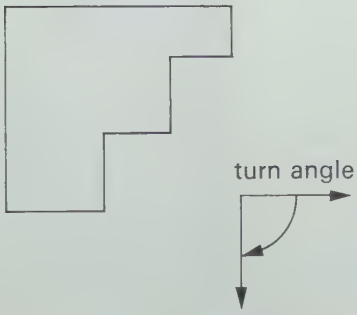
3. 

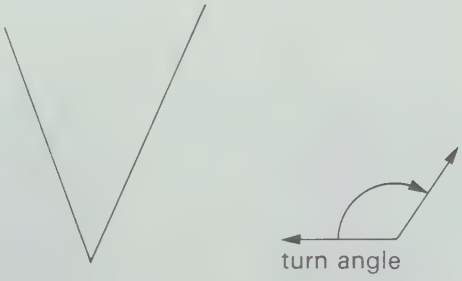
4. 

Copy each shape and the turn angle on plain paper.
Use tracing paper to help you draw
the turn image of the shape.

5. 

6. 

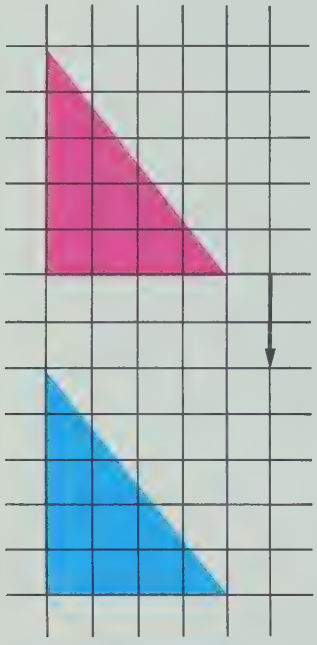
7. 

8. 

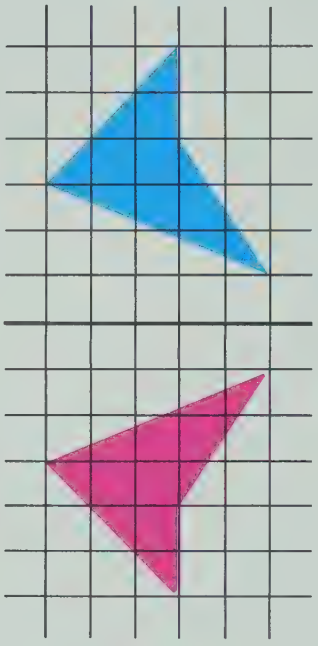
Practice

Copy each picture on graph paper.
Use tracing paper to test whether

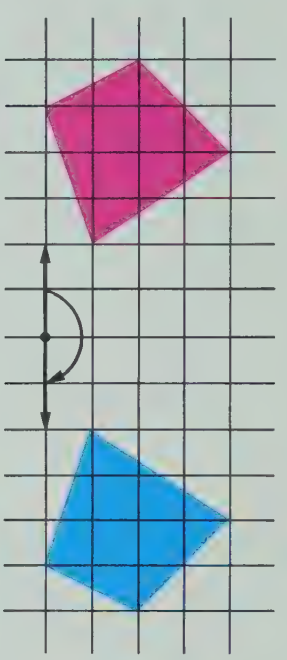
1. the blue shape is the slide image of the red shape for the slide arrow shown.



2. the blue shape is the flip image of the red shape for the flip line shown.

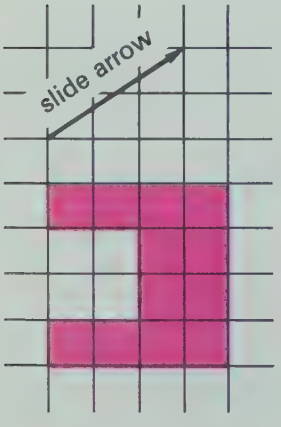


3. the blue shape is the turn image of the red shape for the turn angle shown.

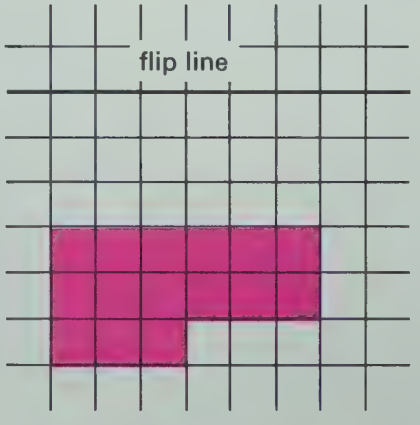


Copy each picture on graph paper.
Then use tracing paper to help you draw

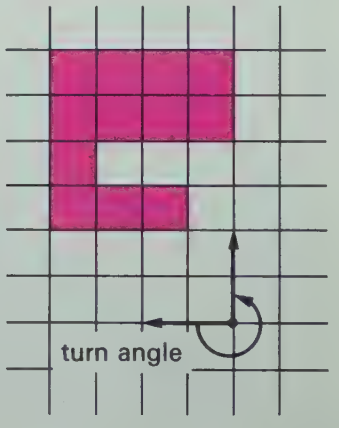
4. the slide image.



5. the flip image.

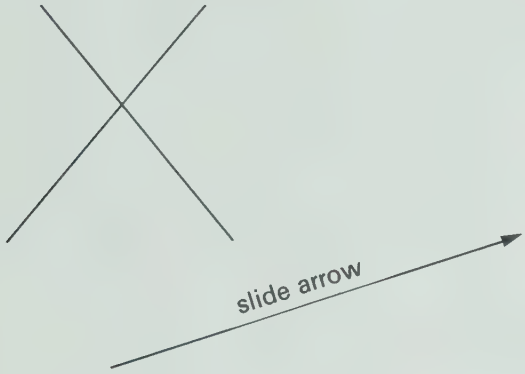


6. the turn image.

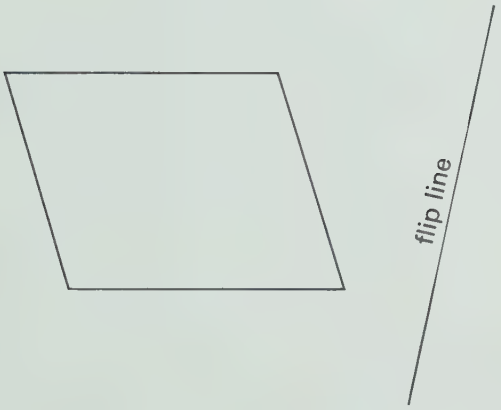


Copy each picture on plain paper. Then use tracing paper to help you draw the image of each shape for the slide arrow, flip line, or turn angle shown.

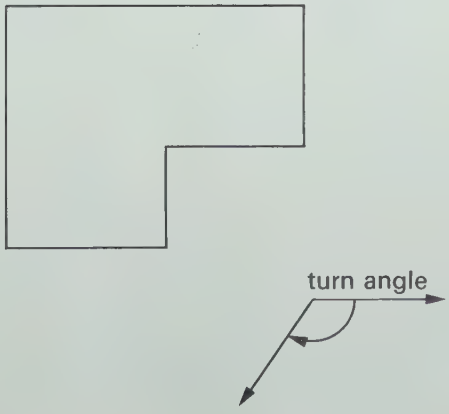
7.



8.



9.



Add.

1. 36 078 46 953	**2.** 27 845 63 795
3. 62.14 33.87	**4.** 36.89 17.83
5. 5.095 2.298	**6.** 4.849 4.967

Subtract.

7. 82 354 17 416	**8.** 76 001 38 523
9. 90.46 34.27	**10.** 82.07 25.04
11. 7.005 6.168	**12.** 3.697 0.658

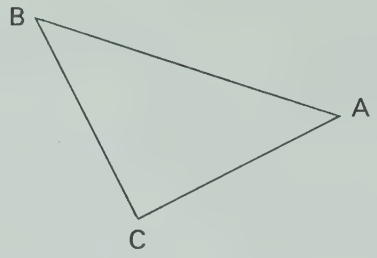
Multiply.

13. 6749 23	**14.** 8015 49
15. 387 528	**16.** 406 796
17. 197 5.9	**18.** 2.06 81
19. 7.8 4.7	**20.** 3.5 2.6
21. 68.5 5.9	**22.** 97.1 8.7
23. 49.5 20.4	

KEEPING SHARP

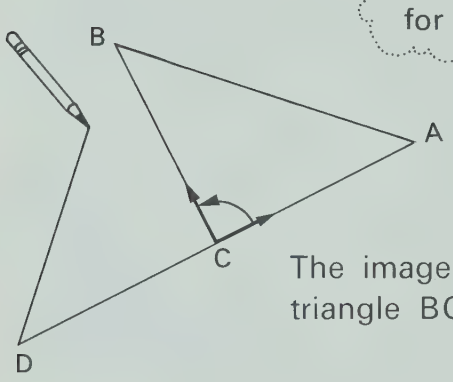
Building Polygons from Triangles

Use turns and triangle ACB to build a polygon.



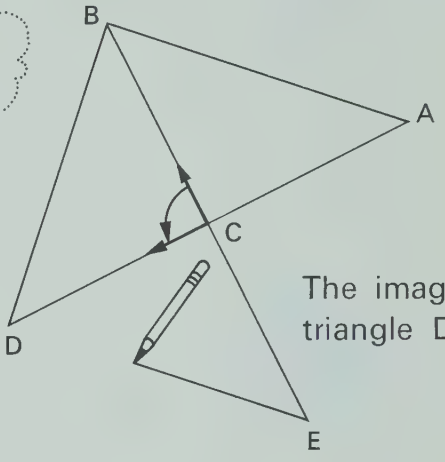
1. Use *angle* ACB as the turn angle and draw the turn image of *triangle* ACB.

C is the turn centre for each of these.



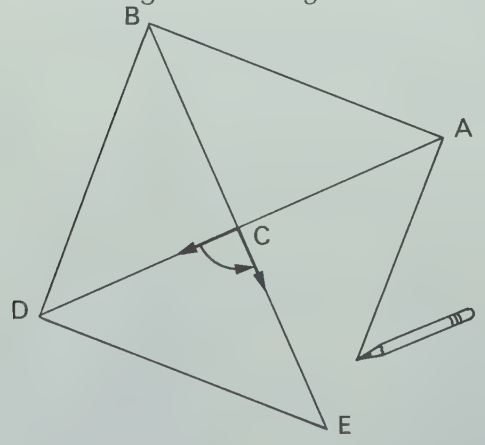
The image is triangle BCD.

2. Use *angle* BCD as the turn angle and draw the turn image of *triangle* BCD.

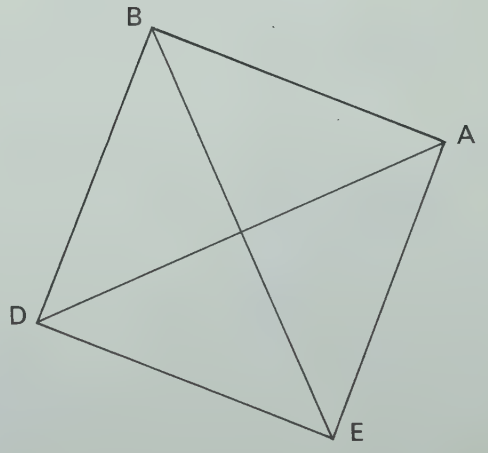


The image is triangle DCE.

3. Use *angle* DCE as the turn angle and draw the turn image of *triangle* DCE.



The image is triangle ECA.

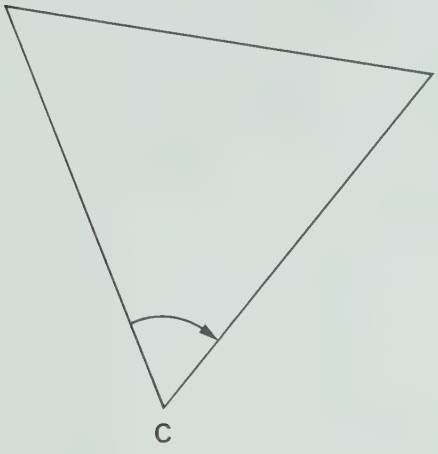


The result is polygon ABDE.
The polygon is a square.

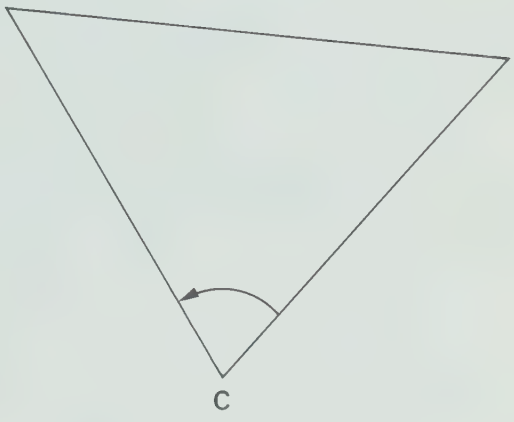
Exercises

Carefully copy each triangle and use as many turns as needed to build a polygon. Use C as the turn centre for the turn angle.

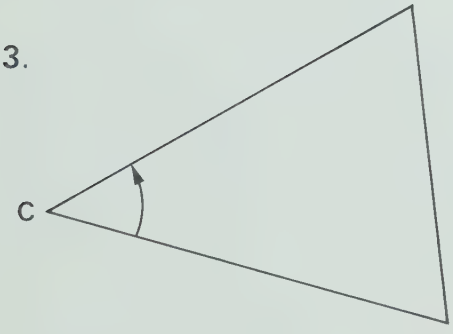
1.



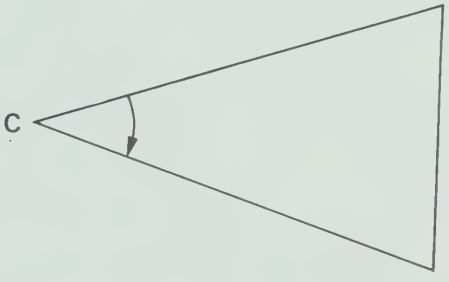
2.



3.



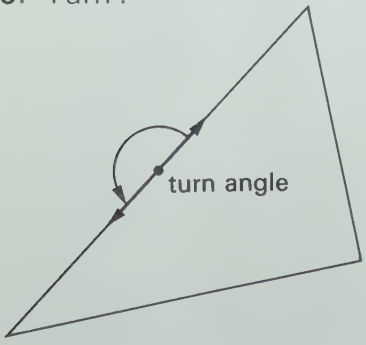
4.



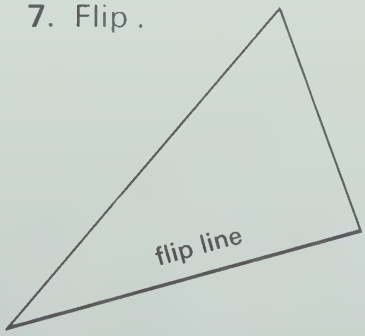
5. Name the polygons you drew for Exercises 1 to 4.

Copy each triangle. Draw the suggested flip or turn image. Name the polygon that results.

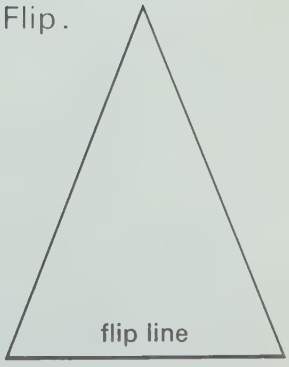
6. Turn.



7. Flip.

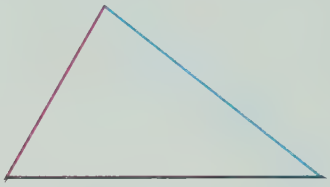


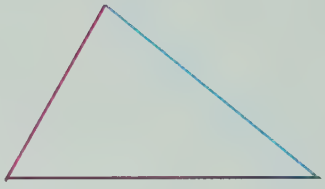
8. Flip.



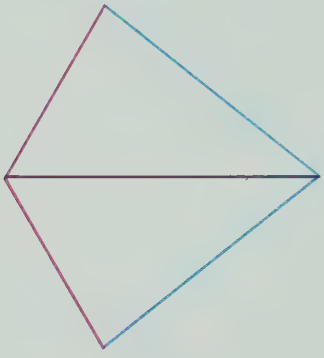
Sharing Congruent Sides

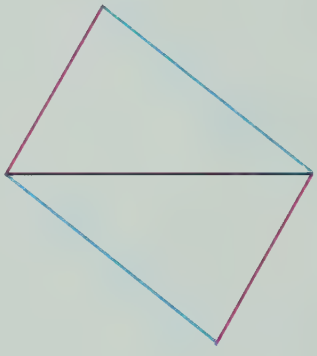
How many different shapes can be made by fitting congruent triangles together along their matching sides?

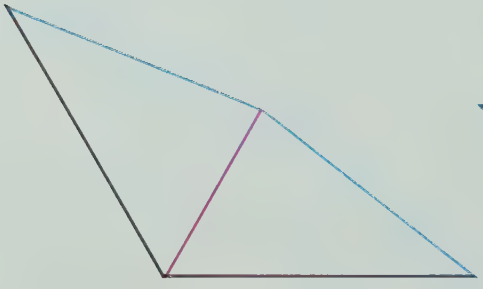


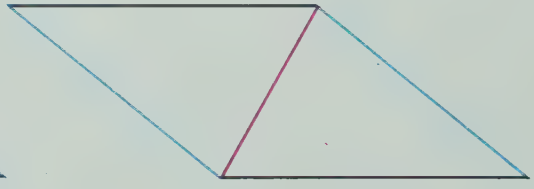


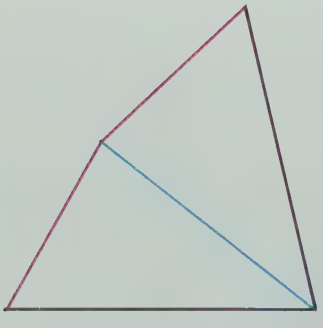
Color the matching sides in each triangle the same. Then fit the sides with the same color together.

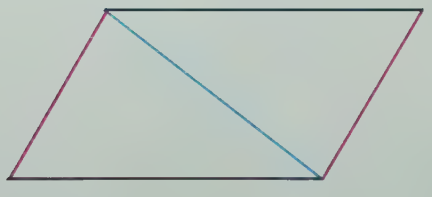










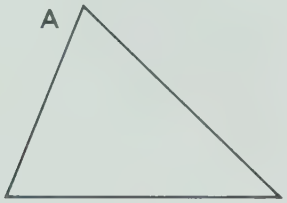


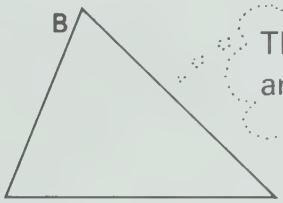
As many as 6 different shapes can be made when congruent triangles are fitted together along matching sides.

Exercises

Trace shape A. On another piece of tracing paper trace shape B. Color the matching sides of the congruent shapes the same color. Cut out the shapes and fit them together to make as many different shapes as possible.

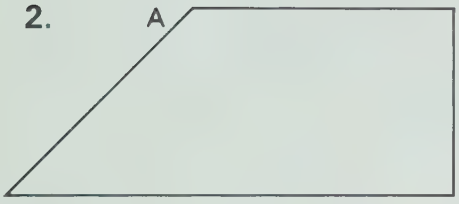
1.

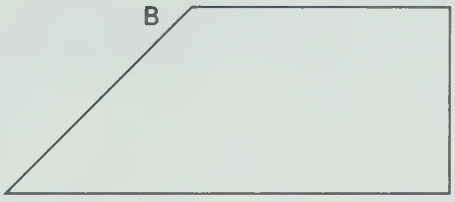




The two triangles are congruent.

2.

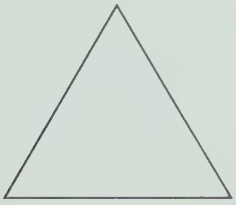




The two trapezoids are congruent.

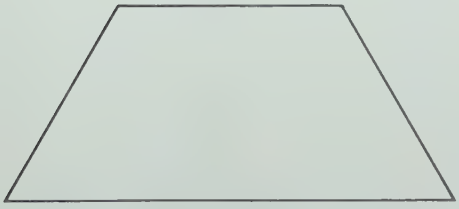
Trace the shape. On another piece of paper, trace it again. The two shapes you traced are congruent. Color their matching sides, cut them out, and fit them together to make as many different shapes as possible.

3.

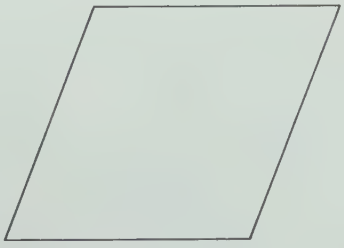


4.

5.



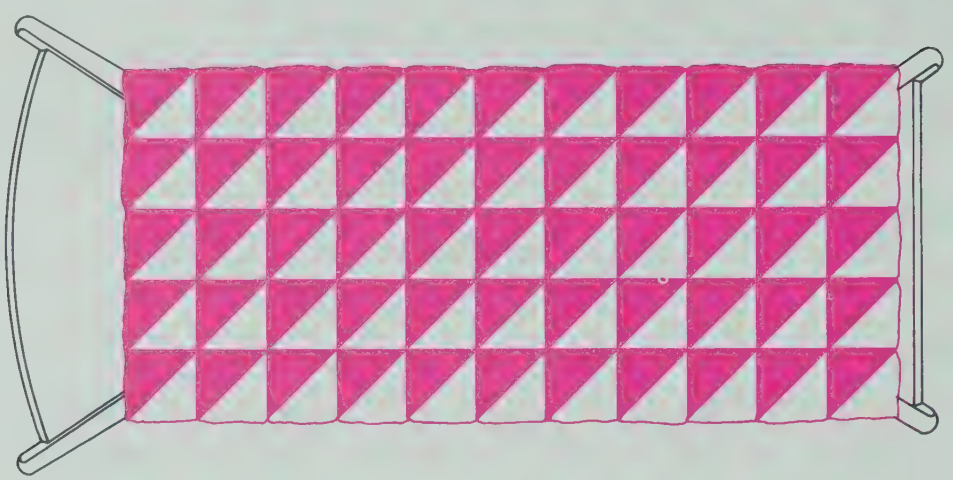
6.



7. When two congruent shapes share a side in Exercises 1 to 6, is one shape the slide, flip, or turn image of the other shape?

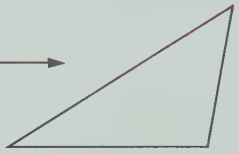
Tiling with Congruent Shapes

The patches in the quilt show triangles.
All the triangles are congruent.

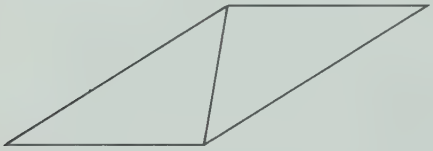


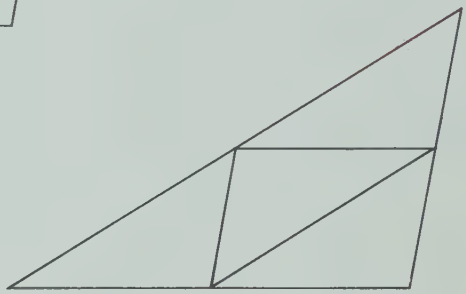
Working Together

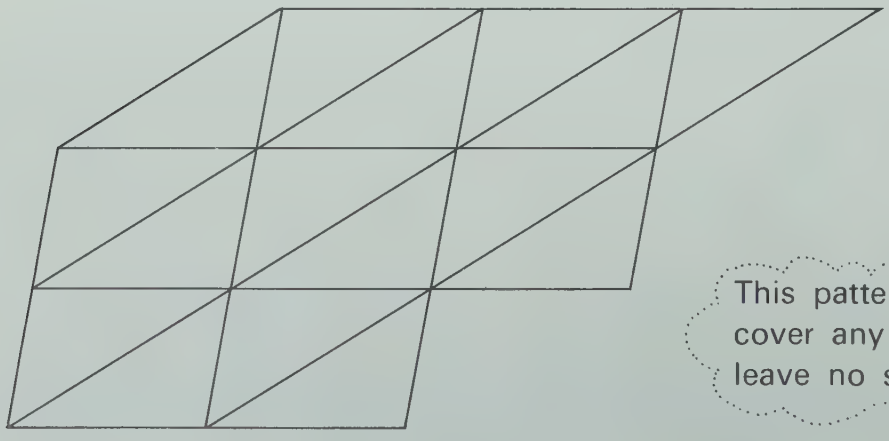
Draw a triangle like this one. ⟶



Then use tracing paper to help you draw each of these.







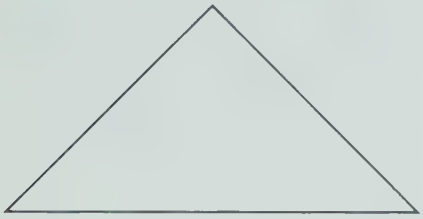
This pattern could cover any region and leave no spaces.

Exercises

Trace the shape. Use it to make a pattern by placing congruent sides together. Show the shape at least 9 times in the pattern.

The shapes should touch but not overlap.

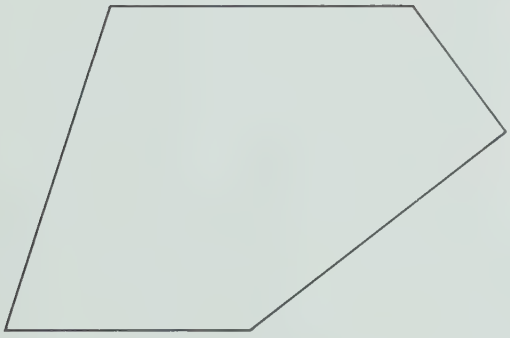
1.



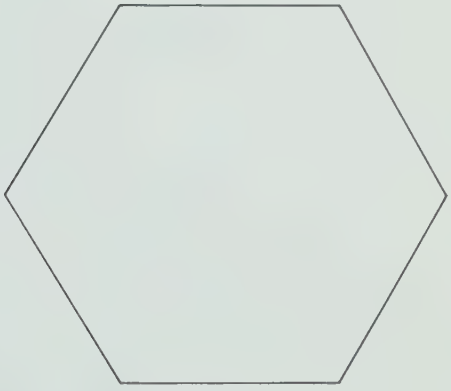
2.

Do your patterns leave any spaces?

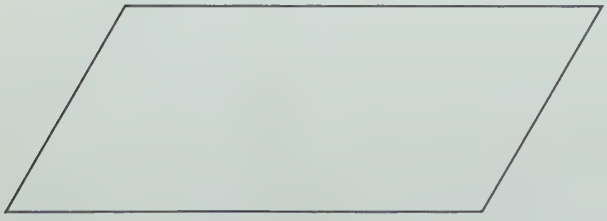
3.



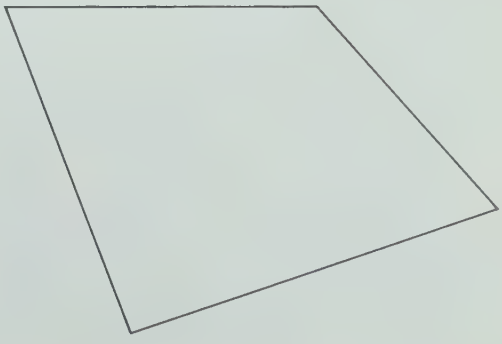
4.



5.

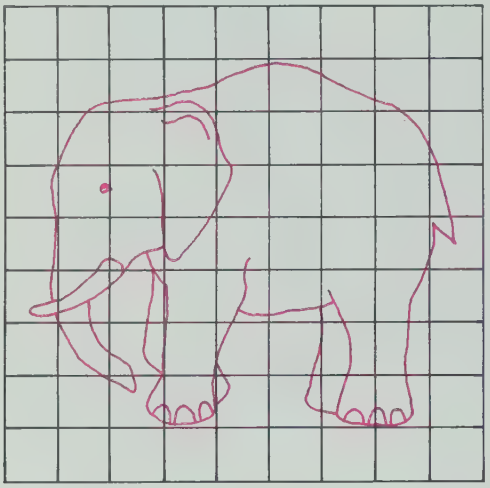


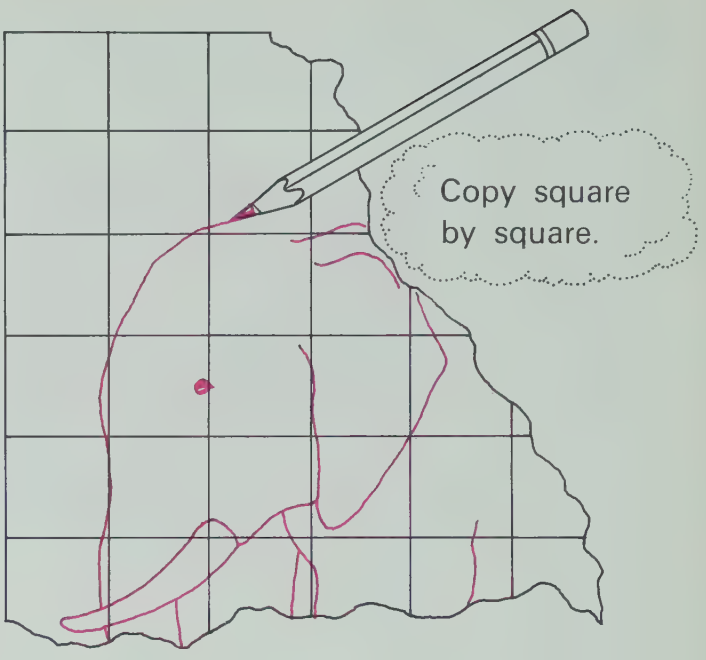
6.

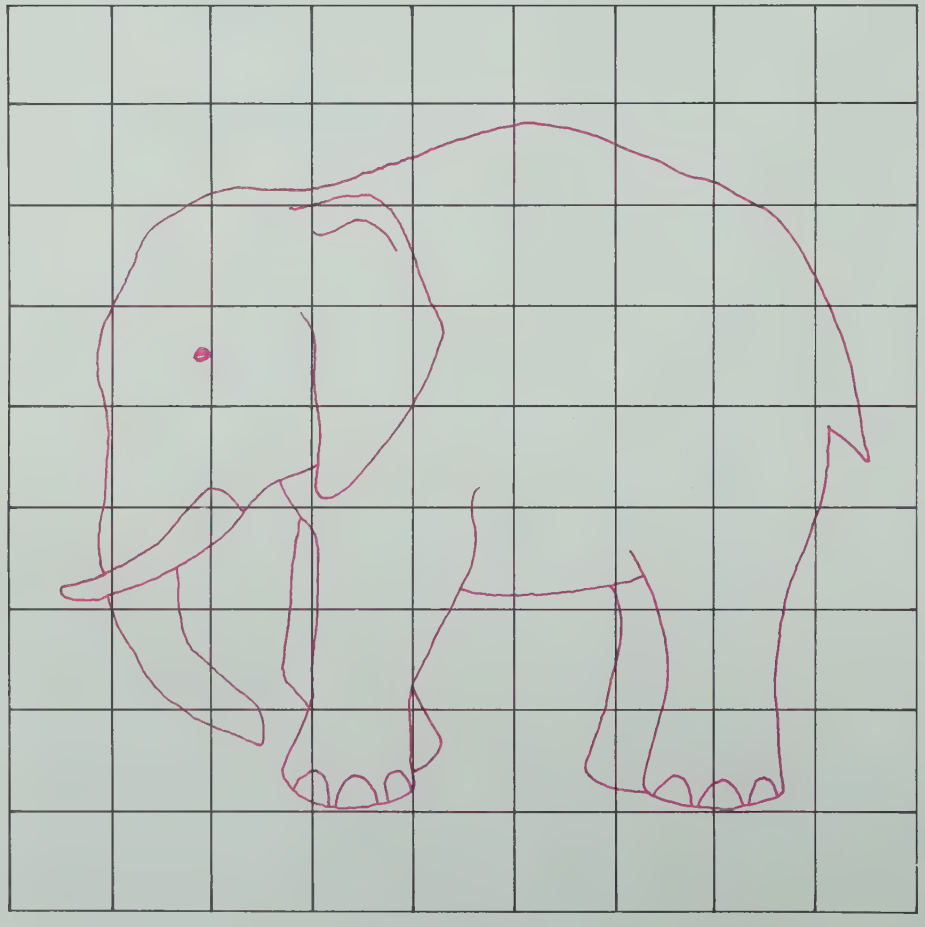


Copying Pictures Using Grids

Copy this picture of the elephant on a grid of a different size.



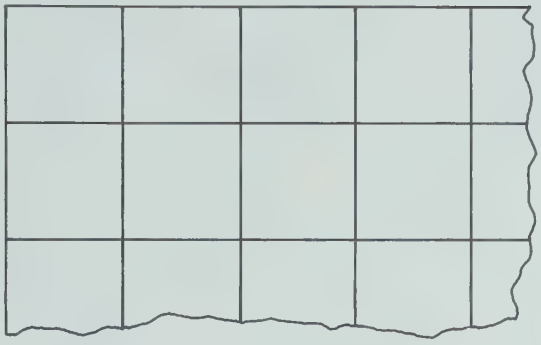




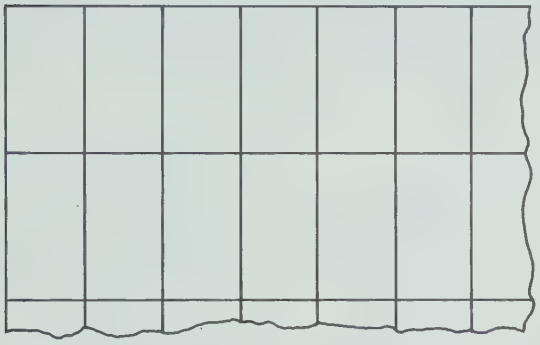
Exercises

Copy the elephant on grids that look like these.

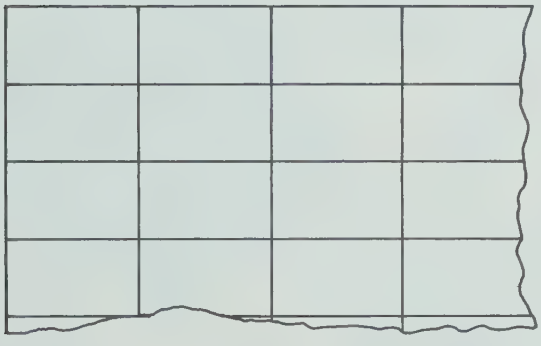
1.



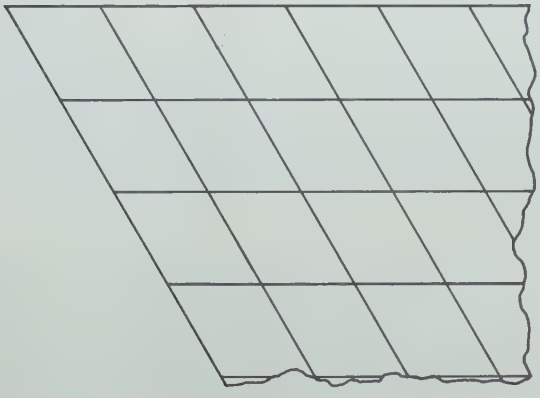
2.



3.

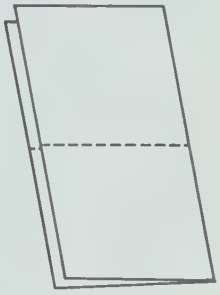


*4.



Fold a piece of paper.

Open it. Fold it again so that one half of the first fold line matches the other half.



Open the paper.

1. What kinds of angles are formed by the two fold lines?
2. What word completes the following sentence?

   The fold lines are ___?___ to each other.

Draw a line segment on a piece of paper.

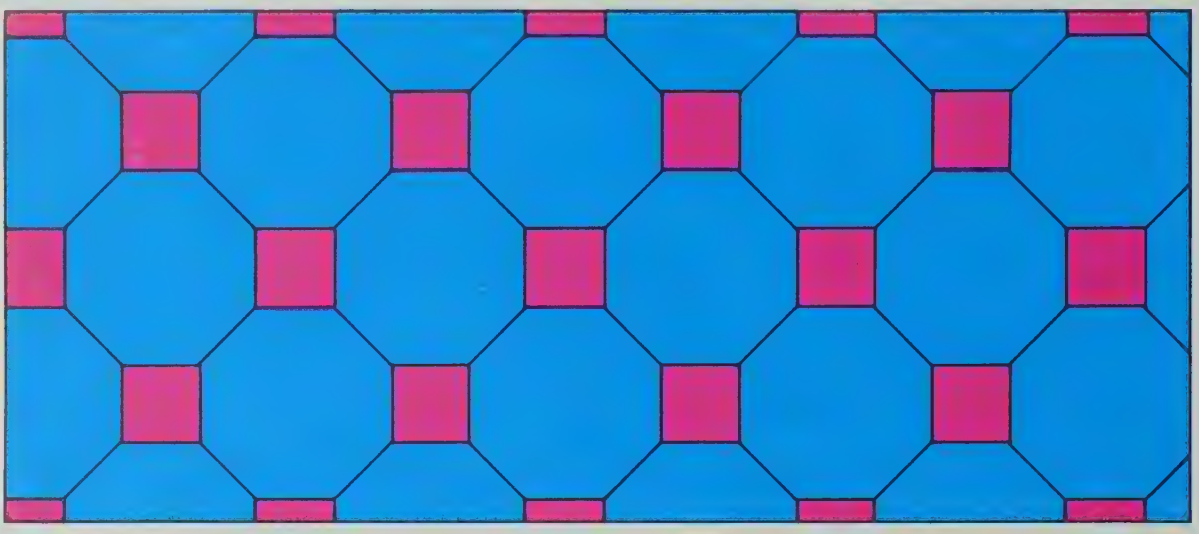
Fold the paper so that one end point matches the other end point.

Open the paper.

3. What kinds of angles are formed by the fold line and line segment?
4. The fold line and line segment are ___?___ to each other.
5. Why is **midpoint** a good word to use for the point where the fold line and line segment meet?

try this

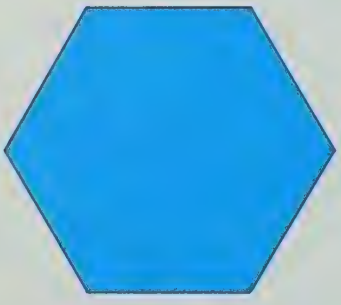
Working with Models

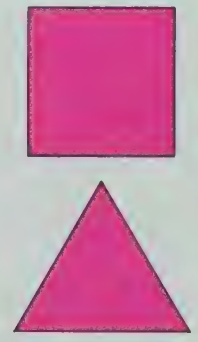


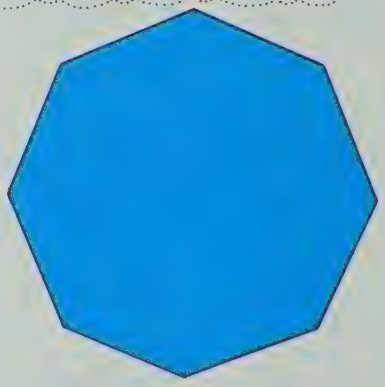
Sometimes two or more different shapes are used for tiling a floor.

1. Try to make a tiling pattern that uses two or more of these shapes.

Remember, a tiling pattern should leave no spaces.







2. Try to make a tiling pattern that uses two or more of these shapes.

triangle (any kind) quadrilateral (any kind)

pentagon hexagon octagon

PROBLEM SOLVING

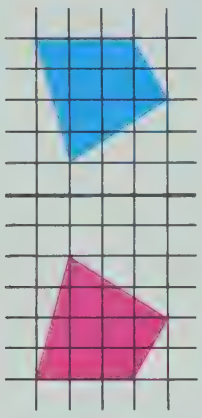
3. Color the tiling patterns that you have made.

4. What patterns could you make?

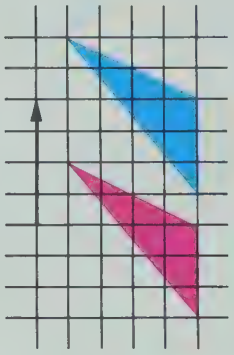
Checking Up

Use tracing paper to test whether

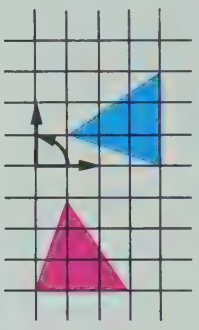
1. the blue shape is the flip image of the red shape for the flip line shown.



2. the blue shape is the slide image of the red shape for the slide arrow shown.

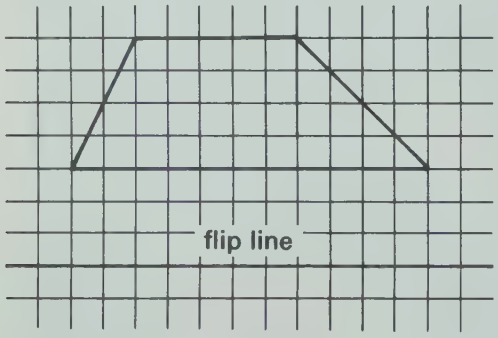


3. the blue shape is the turn image of the red shape for the turn angle shown.

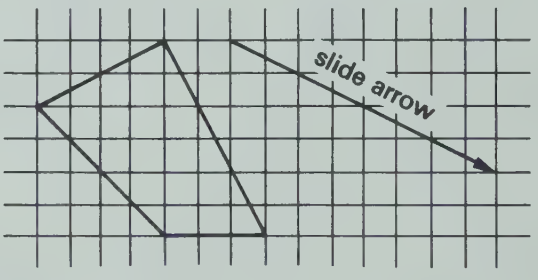


Copy each picture on graph paper.
Then use tracing paper to help you draw

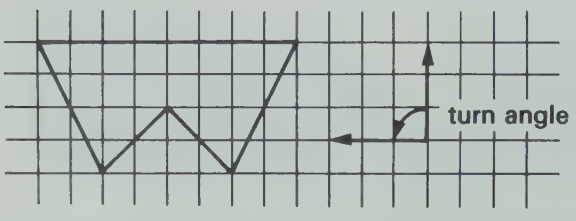
4. the flip image.



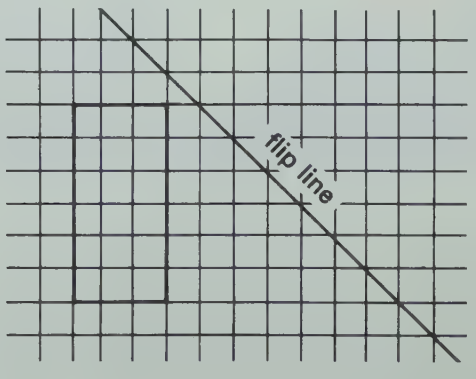
5. the slide image.



6. the turn image.

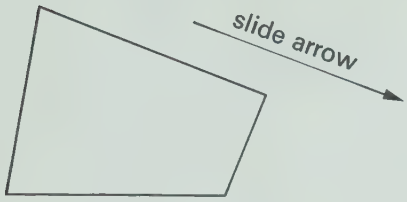


7. the flip image.

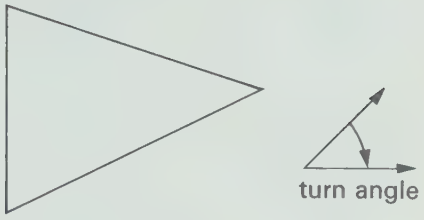


Copy each picture on plain paper.
Then use tracing paper to help you draw

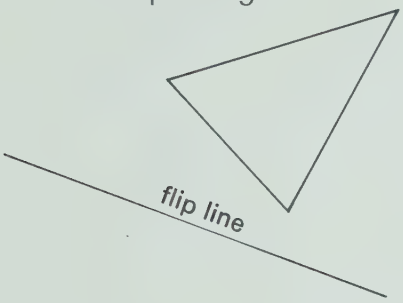
8. the slide image.



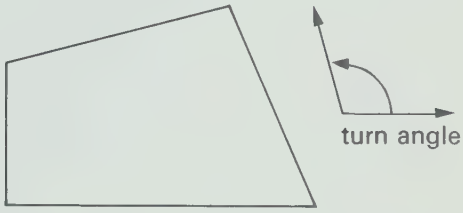
9. the turn image.



10. the flip image.



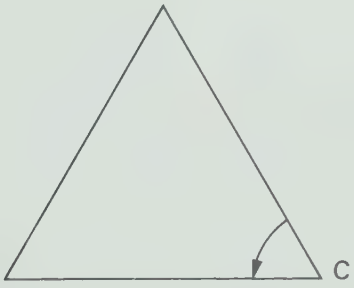
11. the turn image.



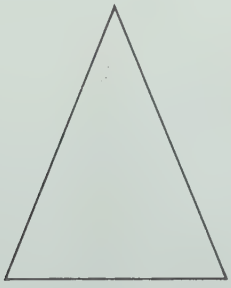
Copy this triangle.
With C as the turn centre
for the turn angles,

12. use turns to build a polygon.

13. Name the polygon you drew.



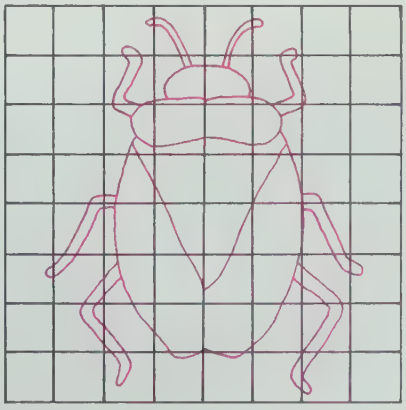
Use this triangle
and tracing paper.



14. Draw a pattern that leaves no spaces. Use the triangle at least 9 times in your pattern.

Using a grid of a different size,

15. copy this picture.



Checking Skills

Add.

1. 3754
   3032

2. $5612
   846

3. $198.67
   373.15

4. 98 548
   9 268

5. 17.54
   83.02
   96.58

6. 4 376
   21 396
   5 312

7. 5 804
   812
   10 272
   5 624

8. 46.118
   79.408
   18.698
   30.648

Subtract.

1. 6539
   4231

2. $27.80
   7.32

3. 902.57
   658.44

4. 7.846
   0.943

5. $58 542
   4 863

6. 91 103
   79 487

7. 8.12
   6.14

8. 564.8
   177.5

9. 41 037
   5 708

10. 70 035
    1 069

9. $70.97 + $60.87
10. 1858.9 + 2455.9
11. 91 072 + 83 462 + 42 196
12. 769 + 36 465
13. 1.051 + 4.351 + 2.751 + 3.658
14. 70.44 + 33.38 + 89.62
15. $9508 + $6667
16. 0.931 + 9.623 + 0.914
17. 6705 + 221 + 9831 + 53

11. 81.4 − 27.9
12. 67 036 − 52 496
13. $8030 − $689
14. 7.7685 − 6.9287
15. 60 000 − 375
16. 75.246 − 36.789
17. 10 090 − 736
18. 4.612 − 1.889
19. $945.21 − $435.66
20. 99 243 − 9 555

Solve.

18. Brian bought 1.56 kg of cheddar cheese and 1.73 kg of soft cheese. How much cheese did he buy?

19. Libby bought items at the grocery store that cost $1.56, $2.79, $0.88, and $3.15. How much did she pay?

Solve.

21. Sharon went to the store with $9.87. She spent $7.36. How much money did she have left?

22. There are 245 g of cereal in one box and 350 g of cereal in a larger box. How much more cereal is in the larger box?

Multiply.

1. 75 × 8

2. \$24 × 36

3. 217 × 49

4. 94.8 × 8

5. 6.071 × 6

6. \$3.90 × 472

7. 104 × 846

8. 6.9 × 8.9

9. 3.05 × 5

10. 745 × 9.75

11. $9 \times \$1974$

12. 8.6×5.6

13. 478×237

14. 79×4369

15. 3×3.189

16. 6×9.8

17. 315×612

18. 8.9×2.8

19. $63 \times \$43.75$

20. $5 \times 79\,124$

21. 7.8×3.6

22. 1.7×7.5

Solve.

23. Each kilogram of apples costs \$0.89. How much will 15 kg of apples cost?

24. Al bought 7 boxes of crackers. There were 375 g of crackers in each box. How heavy were the crackers he bought?

Divide.

1. $6\overline{)9.6}$

2. $5\overline{)\$480}$

3. $40\overline{)12\,360}$

4. $21\overline{)16.380}$

5. $88\overline{)82.72}$

6. $45\overline{)27\,855}$

7. $56\overline{)\$53.76}$

8. $82\overline{)53\,136}$

9. $34\overline{)127\,874}$

10. $93\overline{)803.52}$

11. $506\,160 \div 60$

12. $9.217 \div 13$

13. $\$181.48 \div 52$

14. $43\,316 \div 68$

15. $\$69\,450 \div 75$

16. $920.4 \div 39$

Divide. Use more zeros when needed.

17. $5\overline{)2}$

18. $16\overline{)37.6}$

19. $28\overline{)\$21}$

20. $8\overline{)6}$

21. $64\overline{)28.8}$

22. $35\overline{)6.3}$

23. $152.1 \div 52$

24. $99 \div 72$

25. $34.5 \div 92$

26. $\$147 \div 42$

Solve.

27. Sylvia bought 6 kg of hamburger for \$16.38. How much did each kilogram of hamburger cost?

28. Oscar bought 12 oranges for \$4.68. Each orange cost the same amount. How much did each orange cost?

15 RATIO

Writing Ratios

A chess game has
4 knights and 16 pawns.

The **ratio** of knights
to pawns can be written
in different ways.

4 to 16

knights pawns

4 : 16

knights pawns

$\frac{4}{16}$ knights pawns

Working Together

Give the first number for each ratio.

1. 7 to 9 **2.** 10 to 5

3. the number of rooks for a player to the number of rooks in a game

Give the second number for each ratio.

4. 1 out of 4 **5.** 6 out of 6

6. the number of bishops for a player to the number of bishops for another player

Complete.

7.	5 to 6	5:6	$\frac{5}{6}$
8.	4 to 12	?	?
9.	?	11:1	?
10.	?	?	$\frac{10}{10}$

Exercises

Complete.

1.	2 to 3	2:3	$\frac{2}{3}$
2.	3 to 4	?	?
3.	?	4:6	?
4.	?	?	$\frac{8}{1}$
5.	?	5:5	?

Write each as a ratio in two other ways.

6. 2 out of 7

7. 3:5

8. 8 to 12

9. $\frac{9}{9}$

10. 1 out of 3

11. 7:10

12. 15 to 100

13. $\frac{0}{14}$

14. 4 out of 4

15. 15:8

For each of these, write a ratio in three ways.

Examples: 4 moves out of 9 moves
4 out of 9, 4:9, $\frac{4}{9}$

2 players for 1 game
2 for 1, 2:1, $\frac{2}{1}$

16. a score of 4 games to 3 games

17. a score of 0 games to 6 games

18. winning 8 games out of 8 games

19. 2 players out of 26 players in the final competition

20. the number of rooks in a chess game to the number of players in the game

21. the number of pawns for a player to the number of knights for a player

22. the number of kings in a chess game to the number of pawns in the game

23. the number of queens in a chess game to the number of players in the game

In a chess game, a knight's move is 2 squares along a row or column and then 1 square to the left or right. A knight can move over other chess pieces, but cannot land on a square already occupied except to capture an opponent's piece.

1. How many first moves are possible for a knight when the board is set up for a game as shown in the photograph?

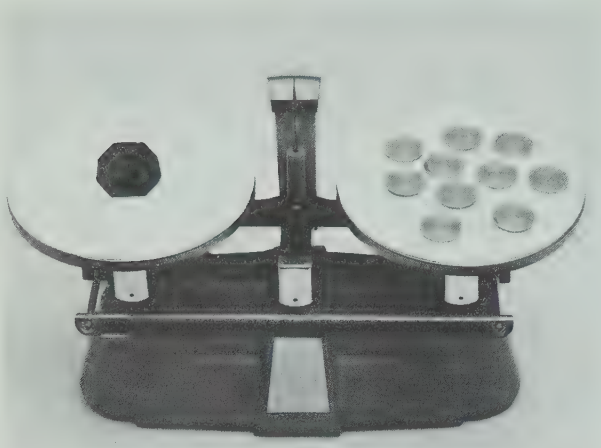
2. For each of the possible first moves for a knight, how many moves are possible for the player's second move with the same knight?

3. How many possible positions are there for a knight after 2 moves?

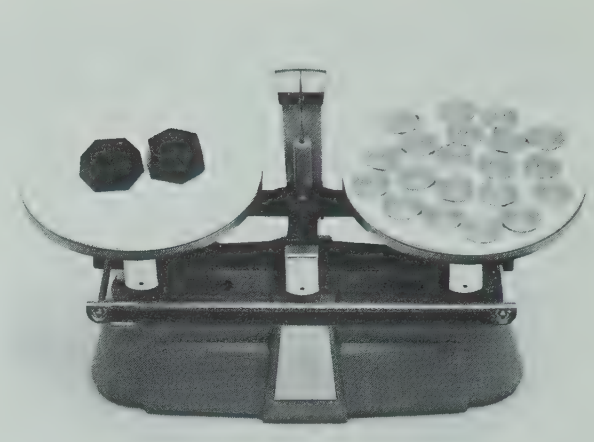
PROBLEM SOLVING

Writing Equivalent Ratios

1 hg (hectogram) is the same mass as 10 dag (decagrams).



1 : 10



2 : 20

The ratios 1:10 and 2:20 are **equivalent ratios**.

This **ratio table** shows equivalent ratios.

If both numbers in a ratio are multiplied by the same number to give another ratio, the ratios are equivalent.

1 × 2 | 1 × 3 | 1 × 4 | 1 × 5

hectograms	1	2	3	4	5
decagrams	10	20	30	40	50

10 × 2 | 10 × 3 | 10 × 4 | 10 × 5

1 hg : 10 dag | 2 hg : 20 dag | 3 hg : 30 dag | 4 hg : 40 dag | 5 hg : 50 dag

Each of these ratios shows the ratio of the mass in hectograms to an equal mass in decagrams.

Working Together

Complete.

1. $\frac{1}{4} = \frac{\square}{\square}$ (1 × 2; 4 × 2)

2. $\frac{4}{7} = \frac{\square}{\square}$ (4 × 3; 7 × ■)

3. $\frac{9}{2} = \frac{\square}{\square}$ (■ × 4; ■ × ■)

4. $\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{14}{35}$

5. $\frac{7}{10} = \frac{14}{20} = \frac{21}{30} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square}$

Exercises

Complete. Use patterns or multiplication.

1. $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{7}{14}$

2. $\frac{5}{4} = \frac{10}{8} = \frac{15}{12} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square}$

3. $\frac{3}{3} = \frac{6}{6} = \frac{9}{9} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square}$

4. $\frac{7}{6} = \frac{14}{12} = \frac{21}{18} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square}$

5. $\frac{4}{1} = \frac{8}{2} = \frac{12}{3} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square}$

6. $\frac{3}{8} = \frac{6}{16} = \frac{9}{24} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square}$

*7. $\frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{8}{28} = \frac{10}{35} = \frac{12}{42} = \frac{\square}{\square}$

*8. $\frac{\square}{\square} = \frac{\square}{\square} = \frac{27}{15} = \frac{36}{20} = \frac{45}{25} = \frac{\square}{\square} = \frac{\square}{\square}$

Complete these ratio tables.

9.

millilitres	1000	2000	?	?	?
litres	1	2	?	?	?

10.

decimetres	1	?	?	4	?
centimetres	10	?	?	40	?

11.

years	100	?	?	?	?
centuries	1	?	?	?	?

12.

minutes	1	?	?	?	?
seconds	60	?	?	?	?

Use a ratio table to solve each of these.

13. 1 can of frozen juice and 3 cans of water are needed to make lemonade. How many cans of water are needed for 7 cans of frozen juice?

14. 500 mL of flour are needed to make 1 cake. How many millilitres of flour are needed to make 4 cakes?

Finding the Missing Term in Equivalent Ratios

An object that is 3 cm tall on the screen has a real height of 8 cm.

The ratio of height on the screen to real height is $\frac{3}{8}$.

The height of the fence on the screen is 48 cm. What is its real height?

The ratio of the height of the fence on the screen to its real height is $\frac{48}{\blacksquare}$.

To find the real height of the fence, write $\frac{3}{8} = \frac{48}{\blacksquare}$.

To find the missing term, think

3 × 16

3 → 48

Then multiply 8 and 16.

$\frac{3}{8} = \frac{48}{128}$

3 × 16

8 × 16

The real height of the fence is 128 cm.

Here is an example of how the missing term can be found by division.

$\frac{12}{18} = \frac{\blacksquare}{3}$

To find the missing term, think

18 → 3

18 ÷ 6

Then, divide 12 by 6.

$\frac{12}{18} = \frac{2}{3}$

12 ÷ 6

18 ÷ 6

Working Together

Complete each of these.

1. $\frac{2}{3} = \frac{8}{\square}$ (2×4, 3×4)

2. $\frac{1}{6} = \frac{\square}{18}$ ($1 \times \blacksquare$, 6×3)

3. $\frac{1}{2} = \frac{2}{\square}$ ($1 \times \blacksquare$, $\blacksquare \times \blacksquare$)

4. $\frac{3}{5} = \frac{\square}{10}$

5. $\frac{10}{35} = \frac{2}{\square}$ ($10 \div 5$, $35 \div 5$)

6. $\frac{3}{12} = \frac{1}{\square}$ ($3 \div 3$, $12 \div \blacksquare$)

7. $\frac{72}{40} = \frac{\square}{5}$ ($\blacksquare \div \blacksquare$, $40 \div \blacksquare$)

8. $\frac{27}{21} = \frac{\square}{7}$

Exercises

Complete each of these.

1. $\frac{1}{2} = \frac{\blacksquare}{12}$
2. $\frac{5}{6} = \frac{35}{\blacksquare}$
3. $\frac{35}{40} = \frac{\blacksquare}{8}$
4. $\frac{8}{10} = \frac{4}{\blacksquare}$
5. $\frac{7}{10} = \frac{70}{\blacksquare}$
6. $\frac{2}{9} = \frac{\blacksquare}{27}$
7. $\frac{6}{8} = \frac{\blacksquare}{4}$
8. $\frac{4}{12} = \frac{\blacksquare}{3}$
9. $\frac{18}{10} = \frac{\blacksquare}{5}$
10. $\frac{9}{9} = \frac{3}{\blacksquare}$
11. $\frac{5}{4} = \frac{\blacksquare}{28}$
12. $\frac{2}{3} = \frac{10}{\blacksquare}$
13. $\frac{100}{100} = \frac{\blacksquare}{5}$
14. $\frac{20}{12} = \frac{5}{\blacksquare}$
15. $\frac{1}{2} = \frac{\blacksquare}{16}$
16. $\frac{10}{1} = \frac{30}{\blacksquare}$
17. $\frac{45}{72} = \frac{\blacksquare}{8}$
18. $\frac{3}{4} = \frac{\blacksquare}{100}$
19. $\frac{6}{42} = \frac{\blacksquare}{7}$
20. $\frac{3}{2} = \frac{24}{\blacksquare}$

Use $=$ or $\neq$ to make true statements.

21. $\frac{3}{8} \bigcirc \frac{6}{16}$
22. $\frac{1}{16} \bigcirc \frac{1}{4}$
23. $\frac{40}{7} \bigcirc \frac{10}{3}$
24. $\frac{6}{45} \bigcirc \frac{2}{15}$
25. $\frac{24}{8} \bigcirc \frac{6}{2}$

For the slide shown on the screen, write a pair of equivalent ratios. Then solve the problems.

26. The girl is 51 cm tall on the screen. What is her real height?

27. The baseball bat is 33 cm long on the screen. What is its real length?

28. The poster is 15 cm wide on the screen. What is its real width?

***29.** The poster is 24 cm long on the screen. What is its real perimeter?

Finding the Missing Term Using Cross Products

The scale on the map shows that 1 cm on the map represents 32 km. On the map, the distance between Louisbourg and Sable Island is 6 cm. What is the distance between these places in kilometres?

The ratio of the map distance in centimetres to the real distance in kilometres is $\frac{1}{32}$.

The ratio of the distance between Louisbourg and Sable Island to the real distance is

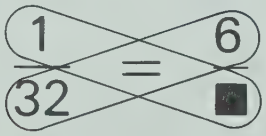
$$\frac{6}{\blacksquare}.$$

To find the real distance, write

$$\frac{1}{32} = \frac{6}{\blacksquare}$$

and use cross products.

$1 \times \blacksquare \qquad 32 \times 6$



$$1 \times \blacksquare = 32 \times 6$$
$$1 \times \blacksquare = 192$$
$$1 \times 192 = 192$$

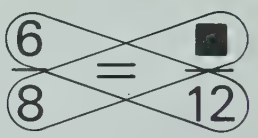
The distance between Louisbourg and Sable Island is 192 km.

Here is another example of finding the missing term.

$$\frac{6}{8} = \frac{\blacksquare}{12}$$

Use cross products.

$6 \times 12 \qquad 8 \times \blacksquare$



$$6 \times 12 = 8 \times \blacksquare$$
$$72 = 8 \times \blacksquare$$

$72 \div 8 = 9$

$$72 = 8 \times 9$$
$$\frac{6}{8} = \frac{9}{12}$$

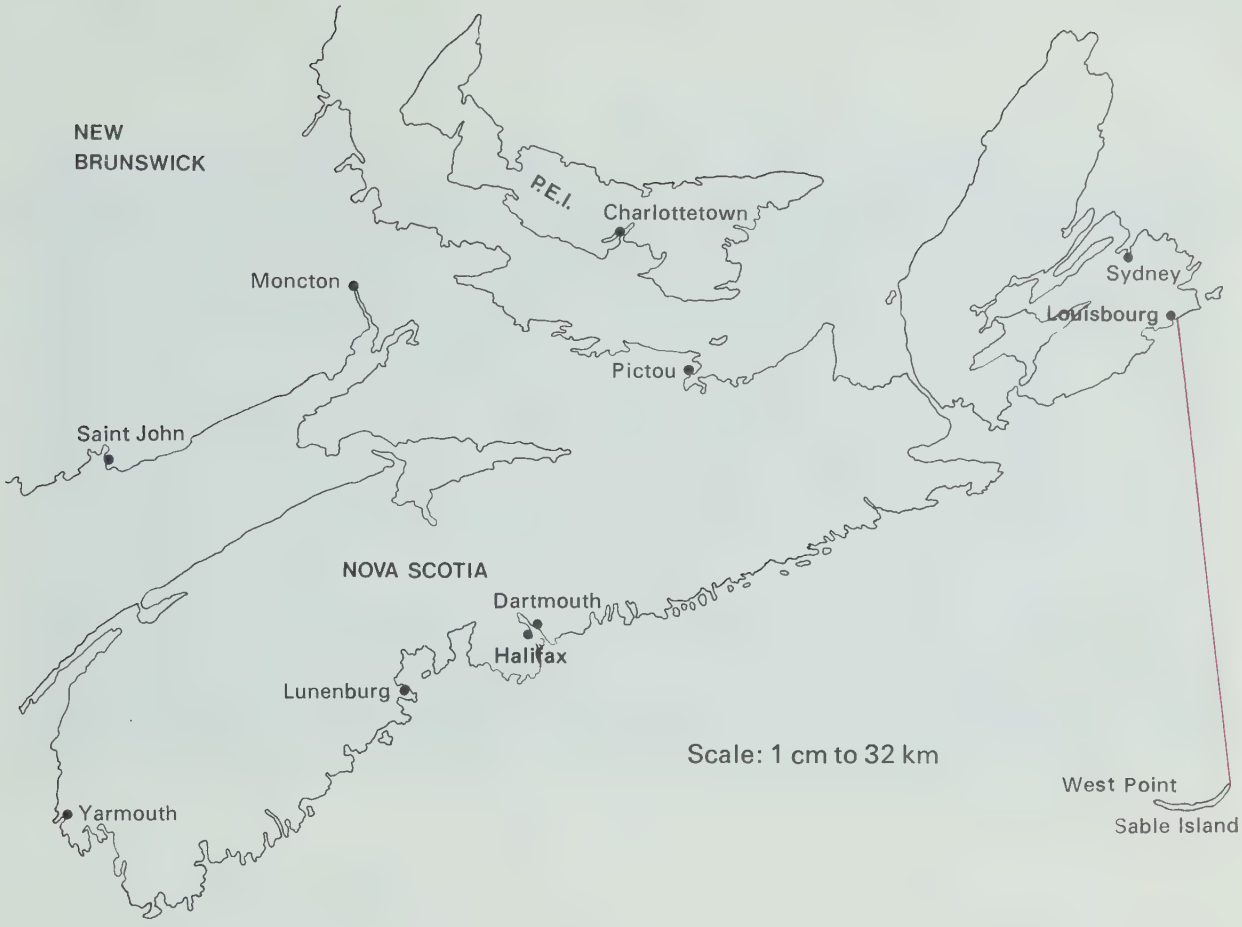
Working Together

Write the cross products.

1. $\frac{3}{5} = \frac{9}{15}$
2. $\frac{12}{16} = \frac{18}{24}$

Use cross products to complete these.

3. $\frac{28}{32} = \frac{\blacksquare}{40}$
4. $\frac{16}{12} = \frac{8}{\blacksquare}$



Exercises

Complete each of these.

1. $\frac{2}{4} = \frac{\blacksquare}{8}$ **2.** $\frac{16}{12} = \frac{4}{\blacksquare}$ **3.** $\frac{7}{21} = \frac{\blacksquare}{6}$ **4.** $\frac{9}{6} = \frac{6}{\blacksquare}$ **5.** $\frac{4}{10} = \frac{\blacksquare}{15}$

6. $\frac{70}{63} = \frac{\blacksquare}{45}$ **7.** $\frac{9}{9} = \frac{7}{\blacksquare}$ **8.** $\frac{40}{48} = \frac{5}{\blacksquare}$ **9.** $\frac{4}{12} = \frac{5}{\blacksquare}$ **10.** $\frac{70}{60} = \frac{\blacksquare}{12}$

11. $\frac{6}{14} = \frac{9}{\blacksquare}$ **12.** $\frac{32}{40} = \frac{\blacksquare}{25}$ **13.** $\frac{24}{21} = \frac{\blacksquare}{7}$ **14.** $\frac{75}{100} = \frac{\blacksquare}{4}$ **15.** $\frac{3}{3} = \frac{2}{\blacksquare}$

16. $\frac{44}{40} = \frac{33}{\blacksquare}$ **17.** $\frac{10}{5} = \frac{\blacksquare}{9}$ **18.** $\frac{6}{12} = \frac{5}{\blacksquare}$ **19.** $\frac{25}{40} = \frac{\blacksquare}{24}$ **20.** $\frac{42}{24} = \frac{21}{\blacksquare}$

Use $=$ or $\neq$ to make true statements.

21. $\frac{4}{16} \bigcirc \frac{2}{8}$ **22.** $\frac{4}{9} \bigcirc \frac{8}{12}$ **23.** $\frac{3}{6} \bigcirc \frac{4}{10}$ **24.** $\frac{12}{6} \bigcirc \frac{6}{3}$ **25.** $\frac{8}{8} \bigcirc \frac{6}{6}$

For each of these, use the map to find the real distance.

26. West Point to Yarmouth
27. Halifax to Saint John
28. Dartmouth to Sydney
29. Lunenburg to Sable Island
30. Moncton to Saint John
31. Charlottetown to Pictou

Writing Equivalent Rates

This plane can travel at a **rate** of 900 km in 1 h which is a speed of 900 km/h (kilometres per hour).

The rates 900:1 and 1800:2 are **equivalent rates**.

This **rate table** shows equivalent rates.

If both numbers in a rate are multiplied by the same number to give another rate, the rates are equivalent.

		900 × 2	900 × 3	900 × 4	900 × 5
kilometres	900	1800	2700	3600	4500
hours	1	2	3	4	5
		1 × 2	1 × 3	1 × 4	1 × 5
	900 km in 1 h	1800 km in 2 h	2700 km in 3 h	3600 km in 4 h	4500 km in 5 h

This rate shows the speed of the plane in kilometres per hour.

Exercises

Complete each of these patterns.

1. $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$

2. $\frac{1}{5} = \frac{2}{10} = \frac{3}{15} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$

3. $\frac{8}{7} = \frac{16}{14} = \frac{24}{21} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$

***4.** $\frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{27}{12} = \frac{36}{16} = \frac{45}{20} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$

5.

metres	7	14	?	?	?
seconds	2	4	?	?	?

6.

litres	15	?	?	?	?
hours	4	?	?	?	?

7.

years	1	?	?	?	?
grams	10	?	?	?	?

8.

minutes	2	?	?	?	?
steps	15	?	?	?	?

Use a rate table to solve each of these.

9. Percy walked at a speed of 5 km/h. How far did he walk in 4 h?

10. Meg ran 16 km at a rate of 2 km in 9 min. How long did she run?

11. Hazel read 55 pages every 2 h. How long did it take her to read 440 pages?

12. Records are on sale for $15 for 4 records. How much do 20 records cost?

13. A small record turns 45 times each minute. How many times does it turn in 4 min?

14. A large record turns 33 times each minute. How long does it take for the record to turn 231 times?

Write only the results.

1. $2 \times 3 \times 5 \div 10 + 12 - 6 + 7$

2. $4 - 1 + 0 + 52 - 50 + 9 - 4$

3. $16 \div 4 \times 6 \div 8 \times 100 + 43 - 3$

4. $54 \div 9 \times 7 \div 6 + 58 + 300 - 100$

5. $39 + 10 + 7000 - 6000 - 5 + 1$

6. $6 \times 6 \div 9 \times 8 + 8 + 60 - 25$

7. $9642 \times 0 \times 538 + 635 - 5 - 200$

8. $320 + 80 - 300 - 50 + 7 - 0 + 2$

9. $3 \times 200 \div 100 \times 8 \div 6 \times 5 \div 10$

10. $20 \times 9 \div 3 + 8 - 20 + 0 - 8$

11. $7000 - 4000 - 999 - 1 + 200 + 5$

12. $60 \div 6 \times 2 \div 5 \times 4 - 8 + 9$

13. $1000 \times 6 \div 100 \div 2 \times 30 \times 30 \div 10$

14. $900 \times 2 \div 3 \times 4 \div 100 \div 8 \div 3$

15. $20 \div 4 \times 50 - 5 + 55 - 275 + 10$

KEEPING SHARP

Finding the Missing Term in Equivalent Rates

Kevin rented a bicycle at the rate of \$2 for 3 h. How much did he pay for renting a bicycle for 12 h?

The cost of renting a bicycle is at the rate of \$2 for 3 h, or $\frac{2}{3}$.

The cost of renting a bicycle for 12 h is \$ ■, where

$$\frac{2}{3} = \frac{■}{12}.$$

$\frac{2}{3}$ and $\frac{■}{12}$ are equivalent rates.

To find the missing term, think

3 → 12

3 × 4.

Then multiply 2 and 4.

$\frac{2}{3} = \frac{8}{12}$

2 × 4

3 × 4

He paid \$8 for renting a bicycle for 12 h.

Exercises

Complete each of these.

1. $\frac{3}{4} = \frac{■}{12}$
2. $\frac{4}{6} = \frac{2}{■}$
3. $\frac{1}{5} = \frac{■}{25}$
4. $\frac{5}{6} = \frac{30}{■}$
5. $\frac{12}{6} = \frac{2}{■}$
6. $\frac{1}{2} = \frac{■}{4}$
7. $\frac{8}{8} = \frac{1}{■}$
8. $\frac{21}{24} = \frac{7}{■}$

Solve.

9. Ned has \$6 to rent a bicycle at the rate of \$3 for 4 h. For how many hours can he rent the bicycle?
10. Julia's family pays \$345 each month to rent their house. How much do they pay for 7 months?
11. 5 pens cost \$2. How much do 15 pens cost?
12. 4 books cost \$12. How much do 16 books cost?

*13. The cost for each person to visit the museum is 50¢. What is the cost for 5 persons?

*14. Water flows from a tap at the rate of 25 mL every 3 s. How long would it take to fill a 1 L container?

Finding the Missing Term Using Cross Products

Esther came from Australia to visit her grandparents.
For 10 Australian dollars, she received 13 Canadian dollars.
How many Canadian dollars did she receive
for 40 Australian dollars?

The rate of exchange for Australian dollars to Canadian dollars was $\frac{10}{13}$.

The rate of exchange for 40 Australian dollars was $\frac{40}{\blacksquare}$.

To find the number of Canadian dollars received, write

$$\frac{10}{13} = \frac{40}{\blacksquare}$$

and use cross products.

$$10 \times \blacksquare = 13 \times 40$$

$$10 \times \blacksquare = 13 \times 40$$

$$10 \times \blacksquare = 520$$

$520 \div 10 = 52$

$$10 \times 52 = 520$$

Esther received 52 Canadian dollars for 40 Australian dollars.

Exercises

Complete each of these.

1. $\frac{4}{8} = \frac{6}{\blacksquare}$
2. $\frac{18}{30} = \frac{\blacksquare}{25}$
3. $\frac{24}{15} = \frac{\blacksquare}{10}$
4. $\frac{6}{18} = \frac{7}{\blacksquare}$
5. $\frac{45}{36} = \frac{\blacksquare}{16}$
6. $\frac{56}{64} = \frac{21}{\blacksquare}$
7. $\frac{9}{12} = \frac{\blacksquare}{28}$
8. $\frac{63}{49} = \frac{54}{\blacksquare}$

Solve.

9. Pierre went to France to visit his aunt. For each dollar, he received 4 francs. How much would he pay for 16 francs?
10. 4 baseballs cost $20. How much do 3 baseballs cost?
11. 7 pencils cost 84¢. Monica has 72¢. How many pencils can she buy?
12. Kay can ride 4 km in 6 min on her bicycle. How long would it take her to ride 8 km?
*13. The bus travels at a speed of 50 km/h. How long would it take to go 35 km?
*14. Tim has learned to type 25 words a minute. How long would it take him to type 40 words?

Writing Percents

Richard's mark on a mathematics test was 81 out of 100.

Richard's mark can be written as a ratio.

number of marks received

$$81 : 100$$

number of possible marks

$$\frac{81}{100}$$

Richard's mark can be written as a **percent**.

$$81\%$$

A percent shows how many out of 100.

Working Together

Complete.

1. $\frac{65}{100} = \blacksquare\ \%$ **2.** $\frac{7}{10} = \frac{\blacksquare}{100} = \blacksquare\ \%$ **3.** $\frac{3}{5} = \frac{\blacksquare}{100} = \blacksquare\ \%$

4.	7 out of 100	7:100	$\frac{7}{100}$	0.07	7%
5.	43 out of 100	?	?	?	?
6.	?	?	?	?	3%

Write as a percent.

7. 8 out of 10 **8.** 1 out of 4 **9.** 2:5 **10.** $\frac{1}{2}$ **11.** 0.75

Exercises

Complete this chart.

1.	12 out of 100	12:100	$\frac{12}{100}$	0.12	12%
2.	78 out of 100	?	?	?	?
3.	?	4:100	?	?	?
4.	?	?	$\frac{3}{100}$	?	?
5.	?	?	?	0.98	?
6.	?	?	?	?	9%

Write each of these as a percent.

7. 15:100 **8.** 1:100

9. $\frac{6}{100}$ **10.** $\frac{24}{100}$

11. 0.72 **12.** 0.05

13. 9:10 **14.** 4:5

15. $\frac{3}{4}$ **16.** $\frac{1}{2}$

17. $\frac{7}{10}$ **18.** 0.1

Write a percent for each of these.

19. On a test, Lara's mark was 3 out of 5.

20. 1 of every 2 students tried out for the track team.

21. The sales tax was 7¢ for every 100¢.

22. The skates were on sale with a discount of 20¢ on every 100¢.

23. Paula received 6¢ interest for every dollar she had in the bank.

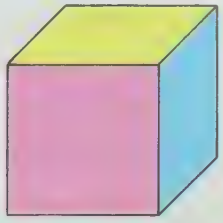
24. Alfred paid 12¢ interest for every dollar he borrowed from the bank.

Martin tossed a cube with 3 yellow faces, 2 red faces, and 1 blue face 50 times.

The top face was red for 21 tosses.

The ratio for the number of times the top face was red to the number of tosses was 21:50.

The top face was red for 42% of the tosses.



$\frac{21}{50} = \frac{42}{100}$

Toss a cube like Martin's cube 50 times and complete the following chart.

Or use 6 papers (3 yellow, 2 red, 1 blue) in a box.

Color	Tally	Number	Ratio	Percent
Yellow	?	?	?	?
Red	?	?	?	?
Blue	?	?	?	?

try this

Estimating with Ratios

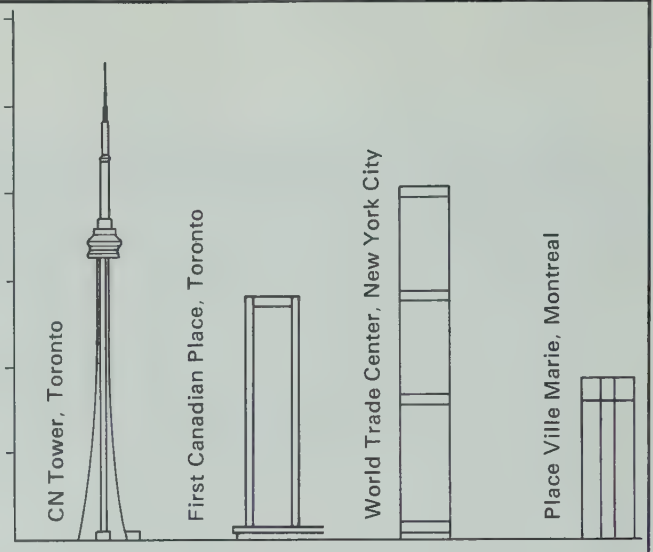
The CN Tower is about twice as tall as the First Canadian Place.

$$\frac{\text{height of CN Tower}}{\text{height of First Canadian Place}} = \frac{2}{1}$$

The First Canadian Place is about half as tall as the CN Tower.

$$\frac{\text{height of First Canadian Place}}{\text{height of CN Tower}} = \frac{1}{2}$$

The CN Tower is 554 m tall.



Using $\frac{2}{1} = \frac{554}{\blacksquare}$ or $\frac{1}{2} = \frac{\blacksquare}{554}$, $2 \times \blacksquare = 554$ $\quad 2 \times 277 = 554$

A good estimate for the height of the First Canadian Place is 277 m.

1. Estimate a ratio that compares the height of the CN Tower to the height of the World Trade Center.
2. Estimate a ratio that compares the height of the World Trade Center to the height of the CN Tower.
3. Estimate a ratio that compares the heights of the CN Tower and Place Ville Marie.
4. Estimate a ratio that compares the heights of the First Canadian Place and the World Trade Center.
5. The CN Tower is 554 m tall. Use this fact and your estimated ratios to estimate the heights of the World Trade Center and Place Ville Marie.

Estimate a ratio that compares

6. the height of your classroom to the height of your desk.
7. the height of your desk to the height of your classroom.
8. the width and length of the Canadian flag.
9. the length and width of a one-dollar bill.
10. the length of your hand and the length of your arm.
11. the length of your shoe and the length of your hand.
12. the lengths of your shortest and longest fingers.
13. the circumference of a circle to its diameter.

PROBLEM SOLVING

Checking Up

Write as a ratio in another way.

1. 3 out of 4

2. 5 to 7

3. 9 in 6

4. 9 to 10

5. 4 in 6

6. 8 out of 8

7. The score was 7 to 3.

8. Greg won 3 games out of 5.

9. Each student has 2 pencils.

Write as a rate in two ways.

10. 2 for 1

11. 8 in 12

12. 6 for 6

13. The machine makes 7 boxes every 2 min.

14. The boat travels at 15 km/h.

15. 4 books cost $9.

Complete. Use patterns or multiplication.

16. $\frac{7}{8} = \frac{14}{16} = \frac{21}{24} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$

17. $\frac{5}{2} = \frac{10}{4} = \frac{15}{6} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare} = \frac{\blacksquare}{\blacksquare}$

18. $\frac{2}{5} = \frac{\blacksquare}{15}$

19. $\frac{20}{35} = \frac{4}{\blacksquare}$

20. $\frac{4}{20} = \frac{\blacksquare}{25}$

21. $\frac{9}{12} = \frac{3}{\blacksquare}$

22. $\frac{4}{8} = \frac{6}{\blacksquare}$

Use cross products to complete each of these.

23. $\frac{6}{2} = \frac{3}{\blacksquare}$

24. $\frac{8}{12} = \frac{\blacksquare}{18}$

25. $\frac{9}{8} = \frac{\blacksquare}{16}$

26. $\frac{14}{16} = \frac{\blacksquare}{24}$

27. $\frac{5}{50} = \frac{4}{\blacksquare}$

Write a percent for each of these.

28. 34:100

29. $\frac{2}{5}$

30. 0.1

31. 1:2

32. $\frac{3}{4}$

33. Max won 1 of the 4 games.

34. Nora swims 3 d out of 5 d.

35. The tax is 5¢ per dollar.

Solve.

36. There are 12 paintbrushes in each box. Norman's class needs 36 paintbrushes. How many boxes of paintbrushes should they buy?

37. On a map, 1 cm represents 30 km. The distance between Edmonton and Saskatoon on the map is 16 cm. What is the real distance between these cities?

38. Elena can skate at a speed of 7 m in 2 s. How far can she skate in 8 s?

39. 2 posters cost $5. How much do 10 posters cost?

Skill Practice–Adding and Subtracting Whole Numbers

Add.

1. 1132 2264	**2.** 6543 1234	**3.** 7722 1275	**4.** 8176 1823	**5.** 7085 1914
6. 12 345 98 765	**7.** 33 445 66 556	**8.** 54 637 78 695	**9.** 99 887 77 889	**10.** 20 089 58 154
11. 4 086 73 452 662	**12.** 3 486 87 773 9 931	**13.** 45 023 77 1 900	**14.** 64 112 87 877 9 796	**15.** 383 45 674 7 098

16. 7784 + 2203
17. 7181 + 673
18. 9909 + 8991
19. 45 836 + 1 452 + 673
20. 2 785 + 12 111 + 10 877
21. 90 807 + 393 + 4 777
22. 123 + 45 678 + 9 012
23. 50 505 + 1 020 + 8 090
24. 17 181 + 32 819 + 25 000
25. 4909 + 4099 + 409
26. 753 + 1357 + 7057

Subtract.

27. 8878 4567	**28.** 9945 7814	**29.** 6789 5678	**30.** 4867 1234	**31.** 9098 7083
32. 14 872 6 864	**33.** 35 674 34 684	**34.** 73 792 37 297	**35.** 99 091 85 019	**36.** 55 855 6 964

37. 8532 − 4372
38. 9517 − 18
39. 7123 − 1237
40. 5505 − 4606
41. 8710 − 811
42. 6056 − 3447
43. 43 000 − 40 015
44. 27 005 − 17 006
45. 58 085 − 996
46. 70 077 − 6 382
47. 87 078 − 10 887
48. 69 163 − 12 088
49. 70 403 − 60 085
50. 31 031 − 13 999
51. 40 004 − 30 555
52. 30 445 − 24 556
53. 70 543 − 67 453
54. 11 025 − 10 976
55. 41 078 − 39 988
56. 30 476 − 9 576
57. 80 781 − 72 272
58. 74 770 − 7 477
59. 4023 − 224
60. 10 001 − 1 110
61. 49 987 − 1 998
62. 7887 − 6996
63. 34 567 − 5 678
64. 70 070 − 69 985
65. 11 678 − 10 789
66. 30 609 − 4 080
67. 5905 − 4915
68. 71 082 − 2 993
69. 81 726 − 72 837
70. 9119 − 9023
71. 10 001 − 2 002
72. 55 667 − 44 558

Skill Practice–Adding and Subtracting Decimals

Add.

1. 13.4 11.7	**2.** 46.3 27.8	**3.** 75.9 10.1	**4.** 81.9 9.7	**5.** 35.8 58.3
6. 13.85 27.15	**7.** 49.91 11.09	**8.** 66.36 43.75	**9.** 29.11 88.55	**10.** 90.97 37.05
11. 0.832 5.796 8.884	**12.** 1.683 1.314 0.772	**13.** 13.982 1.018 6.075	**14.** 59.833 47.733 8.093	**15.** 22.108 0.968 1.732

16. 1.4 + 2.7
17. 9.9 + 1.8
18. 4.8 + 5.7 + 6.6
19. 15.7 + 8.4 + 0.4
20. 11.07 + 13.17 + 9.87
21. 99.09 + 9.99 + 1.97
22. 0.86 + 0.07 + 1.31
23. 17.81 + 8.11 + 0.87
24. 7.087 + 8.118 + 10.045
25. 1.991 + 9.225 + 3.796
26. 99.095 + 17.011 + 8.885
27. 50.054 + 0.505 + 5.005

Subtract.

28. 31.35 2.34	**29.** 48.84 24.48	**30.** 17.81 16.99	**31.** 78.78 29.89	**32.** 64.08 32.09
33. 71.735 7.173	**34.** 35.947 26.158	**35.** 4.555 2.678	**36.** 10.047 1.708	**37.** 0.876 0.088
38. 43.785 5.723	**39.** 34.486 14.975	**40.** 1.616 0.777	**41.** 1.188 0.864	**42.** 0.847 0.708
43. 13.133 7.066	**44.** 15.084 9.175	**45.** 3.911 3.818	**46.** 11.055 2.118	**47.** 60.066 40.404

48. 7.4 − 6.8
49. 8.4 − 7.8
50. 1.5 − 0.6
51. 8.59 − 7.67
52. 0.87 − 0.29
53. 7.08 − 1.89
54. 15.832 − 11.837
55. 25.558 − 20.551
56. 73.495 − 0.986
57. 21.998 − 13.009
58. 80.083 − 0.883
59. 70.007 − 9.369

Skill Practice–Multiplying Whole Numbers

Multiply.

1. 35 × 3	**2.** 37 × 4	**3.** 38 × 5	**4.** 47 × 6	**5.** 58 × 7	**6.** 67 × 8
7. 77 × 9	**8.** 84 × 6	**9.** 97 × 7	**10.** 43 × 4	**11.** 57 × 7	**12.** 63 × 8

13. 2 × 17	**14.** 5 × 72	**15.** 8 × 68	**16.** 7 × 93	**17.** 4 × 87
18. 6 × 166	**19.** 3 × 394	**20.** 6 × 247	**21.** 4 × 336	**22.** 7 × 478
23. 5 × 1234	**24.** 6 × 2468	**25.** 8 × 12 837	**26.** 3 × 3994	**27.** 9 × 87 778

28. 482 × 40	**29.** 597 × 80	**30.** 1732 × 90	**31.** 48 184 × 70	**32.** 76 018 × 50
33. 189 × 700	**34.** 32 × 4000	**35.** 73 × 8000	**36.** 784 × 600	**37.** 558 × 90

38. 49 × 49	**39.** 94 × 94	**40.** 73 × 37	**41.** 57 × 75	**42.** 83 × 38	**43.** 55 × 27

44. 38 × 93	**45.** 72 × 15	**46.** 89 × 96	**47.** 37 × 86	**48.** 19 × 91
49. 123 × 32	**50.** 789 × 89	**51.** 863 × 63	**52.** 1891 × 89	**53.** 7787 × 78

54. 27 × 1284	**55.** 38 × 1574	**56.** 67 × 6788	**57.** 94 × 9876
58. 484 × 484	**59.** 7877 × 768	**60.** 6983 × 432	**61.** 5047 × 347

62. 556 × 7890	**63.** 667 × 8762	**64.** 726 × 9048	**65.** 778 × 2859
66. 414 × 72	**67.** 618 × 435	**68.** 978 × 6000	**69.** 785 × 42
70. 293 × 577	**71.** 379 × 2022	**72.** 817 × 1357	**73.** 416 × 3003
74. 887 × 778	**75.** 237 × 6677	**76.** 348 × 7788	**77.** 697 × 10 102
78. 357 × 246	**79.** 468 × 876	**80.** 917 × 7437	**81.** 827 × 60 606

Skill Practice–Multiplying Decimals

Multiply.

1. 3.2 × 8	**2.** 4.7 × 7	**3.** 3.6 × 6	**4.** 9.7 × 5	**5.** 6.8 × 4	**6.** 5.7 × 9
7. 0.81 × 5	**8.** 0.93 × 4	**9.** 7.07 × 7	**10.** 8.24 × 9	**11.** 9.08 × 6	**12.** 9.68 × 3
13. 0.096 × 2	**14.** 0.746 × 7	**15.** 8.884 × 8	**16.** 4.087 × 6	**17.** 4.409 × 5	**18.** 1.033 × 4

19. 9 × 7.709 **20.** 4 × 9.098 **21.** 5 × 7.947 **22.** 8 × 5.206

23. 8.47 × 27	**24.** 9.09 × 47	**25.** 3.78 × 87	**26.** 6.72 × 38	**27.** 5.96 × 65	**28.** 6.47 × 74
29. 5.59 × 37	**30.** 9.86 × 76	**31.** 8.76 × 65	**32.** 7.65 × 57	**33.** 6.54 × 48	**34.** 0.93 × 39

35. 91 × 4.08 **36.** 83 × 7.09 **37.** 77 × 8.83 **38.** 49 × 1.88

39. 5.77 × 89 **40.** 3.07 × 73 **41.** 4.94 × 44 **42.** 6.96 × 35

43. 246 × 4.563	**44.** 748 × 7.637	**45.** 472 × 9.808	**46.** 687 × 7.068

47. 0.03 × 1000 **48.** 7.74 × 100 **49.** 1000 × 0.06 **50.** 10 × 0.9

51. 1.007 × 0.1 **52.** 0.79 × 1000 **53.** 42 × 0.001 **54.** 771 × 0.0001

55. 3.2 × 0.7	**56.** 4.7 × 0.8	**57.** 3.6 × 0.5	**58.** 9.7 × 0.6	**59.** 6.8 × 0.9	**60.** 5.7 × 0.4
61. 34.7 × 0.7	**62.** 47.3 × 0.5	**63.** 79.9 × 0.8	**64.** 12.7 × 0.6	**65.** 31.7 × 0.9	**66.** 43.8 × 0.4
67. 74.8 × 7.3	**68.** 73.2 × 8.1	**69.** 62.5 × 5.3	**70.** 58.7 × 3.7	**71.** 29.3 × 3.7	**72.** 81.9 × 2.9

73. 88.7 × 46.3 **74.** 49.1 × 81.8 **75.** 52.2 × 64.3 **76.** 65.5 × 39.8

77. 436.2 × 27.3 **78.** 949.9 × 49.7 **79.** 124.8 × 84.2 **80.** 248.1 × 36.9

Skill Practice–Dividing Whole Numbers

Divide. Write the quotient and the remainder.

1. $7\overline{)37}$	**2.** $8\overline{)96}$	**3.** $6\overline{)59}$	**4.** $3\overline{)89}$	**5.** $4\overline{)68}$	**6.** $2\overline{)19}$
7. $6\overline{)44}$	**8.** $9\overline{)39}$	**9.** $8\overline{)72}$	**10.** $7\overline{)50}$	**11.** $5\overline{)50}$	**12.** $9\overline{)98}$

13. $7\overline{)546}$	**14.** $8\overline{)552}$	**15.** $9\overline{)235}$	**16.** $6\overline{)448}$
17. $3\overline{)320}$	**18.** $5\overline{)244}$	**19.** $8\overline{)990}$	**20.** $9\overline{)450}$
21. $6\overline{)9766}$	**22.** $8\overline{)9106}$	**23.** $9\overline{)2408}$	**24.** $5\overline{)8508}$
25. $4\overline{)9002}$	**26.** $6\overline{)7774}$	**27.** $7\overline{)4930}$	**28.** $8\overline{)7787}$
29. $9\overline{)10\,486}$	**30.** $7\overline{)35\,872}$	**31.** $5\overline{)77\,085}$	**32.** $3\overline{)10\,101}$
33. $4\overline{)80\,296}$	**34.** $6\overline{)13\,240}$	**35.** $8\overline{)79\,305}$	**36.** $9\overline{)88\,188}$
37. $10\overline{)580}$	**38.** $20\overline{)260}$	**39.** $40\overline{)8960}$	**40.** $50\overline{)2100}$
41. $90\overline{)8820}$	**42.** $30\overline{)31\,090}$	**43.** $70\overline{)11\,060}$	**44.** $80\overline{)33\,600}$
45. $33\overline{)231}$	**46.** $19\overline{)618}$	**47.** $62\overline{)4590}$	**48.** $37\overline{)1478}$
49. $82\overline{)59\,040}$	**50.** $69\overline{)28\,151}$	**51.** $51\overline{)318\,303}$	**52.** $88\overline{)363\,260}$
53. $44\overline{)320}$	**54.** $60\overline{)487}$	**55.** $29\overline{)900}$	**56.** $78\overline{)644}$
57. $53\overline{)3180}$	**58.** $32\overline{)1795}$	**59.** $45\overline{)3628}$	**60.** $65\overline{)9575}$
61. $77\overline{)80\,003}$	**62.** $14\overline{)44\,044}$	**63.** $28\overline{)60\,004}$	**64.** $83\overline{)23\,646}$
65. $56\overline{)23\,530}$	**66.** $86\overline{)71\,680}$	**67.** $72\overline{)70\,002}$	**68.** $35\overline{)70\,105}$
69. $47\overline{)189\,314}$	**70.** $74\overline{)603\,990}$	**71.** $13\overline{)184\,048}$	**72.** $91\overline{)637\,784}$
73. $16\overline{)549\,027}$	**74.** $67\overline{)810\,012}$	**75.** $94\overline{)684\,928}$	**76.** $23\overline{)456\,780}$

Skill Practice–Dividing Decimals

Divide. Show a decimal quotient for each.

1. $8\overline{)60.8}$	**2.** $9\overline{)53.1}$	**3.** $3\overline{)14.4}$	**4.** $2\overline{)11.6}$	**5.** $5\overline{)28.5}$
6. $7\overline{)48.58}$	**7.** $3\overline{)27.42}$	**8.** $6\overline{)40.98}$	**9.** $5\overline{)36.35}$	**10.** $4\overline{)7.68}$
11. $2\overline{)13.704}$	**12.** $4\overline{)15.664}$	**13.** $7\overline{)64.659}$	**14.** $6\overline{)49.902}$	**15.** $8\overline{)41.392}$
16. $5\overline{)8.15}$	**17.** $9\overline{)22.392}$	**18.** $4\overline{)13.6}$	**19.** $7\overline{)18.62}$	**20.** $6\overline{)33.438}$
21. $4\overline{)1.72}$	**22.** $3\overline{)2.736}$	**23.** $8\overline{)6.72}$	**24.** $5\overline{)3.265}$	**25.** $7\overline{)6.3}$
26. $7\overline{)3.71}$	**27.** $2\overline{)1.612}$	**28.** $9\overline{)53.46}$	**29.** $5\overline{)4.605}$	**30.** $4\overline{)0.828}$
31. $8\overline{)3.84}$	**32.** $3\overline{)0.84}$	**33.** $6\overline{)4.458}$	**34.** $6\overline{)2.736}$	**35.** $9\overline{)1.08}$
36. $2\overline{)8.7}$	**37.** $8\overline{)25.8}$	**38.** $4\overline{)2.6}$	**39.** $8\overline{)36.92}$	**40.** $5\overline{)30.6}$
41. $8\overline{)59.56}$	**42.** $5\overline{)0.19}$	**43.** $2\overline{)15.55}$	**44.** $6\overline{)29.91}$	**45.** $8\overline{)3.4}$
46. $4\overline{)31.3}$	**47.** $8\overline{)23.8}$	**48.** $4\overline{)0.54}$	**49.** $5\overline{)7.52}$	**50.** $8\overline{)70.8}$

51. $4\overline{)10}$	**52.** $5\overline{)11}$	**53.** $8\overline{)57}$	**54.** $8\overline{)39}$	**55.** $4\overline{)1}$	**56.** $6\overline{)21}$
57. $5\overline{)8}$	**58.** $2\overline{)7}$	**59.** $4\overline{)37}$	**60.** $5\overline{)32}$	**61.** $8\overline{)10}$	**62.** $8\overline{)68}$
63. $4\overline{)23}$	**64.** $8\overline{)45}$	**65.** $8\overline{)6}$	**66.** $4\overline{)19}$	**67.** $5\overline{)4}$	**68.** $8\overline{)47}$

69. $18\overline{)64.98}$	**70.** $81\overline{)396.9}$	**71.** $37\overline{)34.336}$	**72.** $63\overline{)170.1}$
73. $75\overline{)402.75}$	**74.** $58\overline{)38.86}$	**75.** $24\overline{)144.96}$	**76.** $12\overline{)95.52}$
77. $42\overline{)17.052}$	**78.** $79\overline{)150.1}$	**79.** $94\overline{)81.498}$	**80.** $86\overline{)11.524}$

81. $34\overline{)175.1}$	**82.** $15\overline{)9.72}$	**83.** $40\overline{)365.2}$	**84.** $25\overline{)151.5}$	**85.** $12\overline{)32.1}$
86. $56\overline{)203}$	**87.** $45\overline{)9}$	**88.** $10\overline{)77}$	**89.** $92\overline{)575}$	**90.** $35\overline{)168}$

Glossary

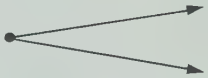
Acute angle: an angle whose measure is greater than 0° but less than 90°.

Addend: *see* Addition.

Addition: an operation that combines two or more numbers, called *addends*, to give exactly one number, called the *sum*.

$$\underset{\text{addends}}{10 + 8 + 5} = \underset{\text{sum}}{23}$$

Angle: two rays with the same end point.



Area: the number of unit squares needed to cover a region.

Array: an arrangement of objects in rows and columns. This array has 3 rows and 5 columns.

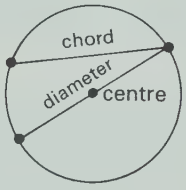
Average: the quotient obtained by dividing the sum of a set of numbers by the number of addends.

Capacity: the amount a container can hold.

Centre: (of a circle): the point that is the same distance from all the points of a circle.

Chord (of a circle): a line segment with both end points on a circle.

Circle: a closed curve all of whose points are the same distance from the centre.



Circumference: the distance around a circle.

Common (like) denominator: a common multiple of two or more denominators. 12 is a common denominator for $\frac{1}{6}$ and $\frac{1}{4}$.

Common factor: a number that is a factor of two or more numbers. 3 is a common factor of 6 and 18.

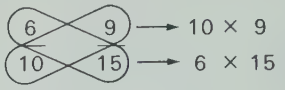
Common multiple: a number that is a multiple of two or more numbers. 18 is a common multiple of 2 and 3.

Composite number: a number that has factors other than itself and 1.

Cone: a three-dimensional figure shaped like this.

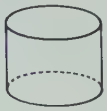
Congruent figures: geometric figures that have the same size and shape.

Cross products: two products formed from the numbers in two fractions or ratios, like this.



Cube: a rectangular prism with each of its six faces a square.

Cylinder: a three-dimensional figure shaped like this.



Decagon: a polygon with ten sides.

Decimal: numerals such as 0.125, 1.25, and 12.5 are decimals. The position of the *decimal point* determines the place values of the digits.

Degree (of an angle): a unit for measuring angles.

Degree (of temperature): a degree Celsius is one-hundredth of the difference in temperature between the boiling point and the freezing point of water.

Denominator: in the fraction $\frac{3}{4}$ the denominator is 4. It represents the number of equal parts into which a whole has been divided, or the number of wholes that are being considered, or the second term in a ratio.

Diameter: a line segment having end points on a circle and containing the centre. *See* Circle.

Difference: *see* Subtraction.

Digit: any of the individual symbols used to write numerals. In the base-ten system, the digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

Discount: an amount by which a price is reduced. It is often stated as a fraction or a percent of the price.

Dividend: *see* Division.

Division: the operation of finding either the number of equal groups or the number in each of equal groups.

$$\begin{array}{rl} & 5 \leftarrow \text{quotient} \\ \text{divisor} \rightarrow 7\overline{)37} & \leftarrow \text{dividend} \\ \underline{35} & \\ 2 & \leftarrow \text{remainder} \end{array}$$

Divisor: *see* Division.

Edge: the line segment where two faces of a three-dimensional figure meet.

End point: the end of a line segment or a ray.

Equation: a mathematical sentence that uses the symbol $=$, such as $17 + 2 - 11 = 8$.

Equilateral triangle: a triangle with its three sides of equal length.

Equivalent fractions: fractions that name the same number. $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{3}{6}$ are equivalent fractions.

Equivalent ratios: ratios whose cross products are equal. $\frac{5}{6}$ and $\frac{10}{12}$ are equivalent because $5 \times 12 = 6 \times 10$.

Estimate: an approximate result found by rounding the numbers in an operation or by making a thoughtful guess.

Even number: a whole number for which 2 is a factor.

Expanded form: a form of a numeral written as the sum of its digits with each digit showing its value. $7000 + 800 + 50 + 6$ is an expanded form for 7856.

Exponent: a number showing how many times another number is used as a factor.

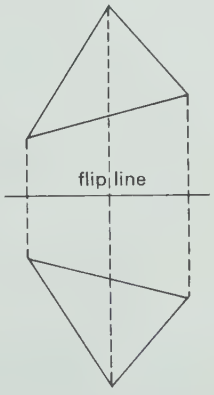
$5 \times 10 \times 10 \times 10 = 5 \times 10^3$ ← exponent

Face: a flat surface of a three-dimensional figure.

Factor: *see* Multiplication.

Flip: describes a motion that matches points in two congruent shapes like this.

Flip image: the flip image of a shape is congruent to the shape. Each point of the shape and its matching point of the flip image are the same distance from a line but on opposite sides of it. The line is called the *flip line*.



Flip line: *see* Flip image.

Fraction: numerals such as $\frac{2}{3}$, $\frac{2}{2}$, and $\frac{6}{4}$ are fractions. They represent parts of a whole, or parts of a set, or a ratio. When the numerator is less than the denominator as in $\frac{2}{3}$, the numeral is a *proper fraction*. When the numerator is equal to or greater than the denominator, as in $\frac{2}{2}$ and $\frac{6}{4}$, the numeral is an *improper fraction*.

Graph:
(i) a picture used to show information. It may be a bar graph, a circle graph, a line graph, or a pictograph.
(ii) points on a grid matched with given ordered pairs.

Greater than ($>$): describes a relation between two numbers that are not equal, such as $6 > 4$.

Greatest common factor: the greatest of the factors common to two or more numbers. 4 is the greatest common factor of 8, 12, and 24.

Hexagon: a polygon with six sides.

Integer: . . ., $^{-}3$, $^{-}2$, 1, 0, $^{+}1$, $^{+}2$, $^{+}3$, . . . are the integers. An integer may be positive or negative. 0 is neither positive nor negative.

Interest: money paid for the use of money.

Intersecting lines: two lines with exactly one point in common.

Intersection: the one point common to intersecting lines.

Isosceles triangle: a triangle with two sides of equal length.

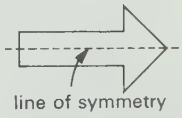
Least common multiple: the least of the multiples common to two or more numbers. 12 is the least common multiple of 4 and 6.

Less than ($<$): describes a relation between two numbers that are not equal, such as $4 < 6$.

Like denominator: *see* Common denominator.

Line: a straight path that continues without end.

Line of symmetry: a line that divides a shape into two parts that can be matched by folding the shape in half.



Line segment: a part of a line. It has two end points.

Line symmetry: a property of any shape that can be folded in half so that the two parts match.

Lowest-terms fraction: a fraction whose numerator and denominator have no common factor greater than 1.

Mass: the amount of matter in a body.

Minuend: *see* Subtraction.

Mixed form: a number is in mixed form when it is expressed as a whole number and a fraction.

Multiple: a multiple of a number is the product of that number and a whole number. 0, 3, 6, 9, 12, . . . are the multiples of 3.

Multiplication: an operation that combines numbers, called *factors*, to give one number, called the *product*.

$$3 \times 7 = 21$$

factors product

Number line: a drawing that matches a set of numbers and a set of points in a line, one to one.

Number sentence: a statement about the relation between two numbers, such as

$$2 + 7 = 9, \quad 3 < 6, \quad 5 > 2.$$

Numeral: a symbol, or a group of symbols, that represents a number. FIVE, 5, V, 2 + 3, 9 − 4 and 𝍸 are numerals.

Numerator: in the fraction $\frac{3}{4}$ the numerator is 3. It represents the number of equal parts of a whole, or the number of parts of a set that are being considered, or the first term in a ratio.

Obtuse angle: an angle whose measure is greater than 90° but less than 180°.

Octagon: a polygon with eight sides.

Odd number: a whole number for which 2 is not a factor.

Ordered pair: a pair of numbers for which the order is important. (2, 6) and (6, 2) are different ordered pairs.

Parallel lines: lines in the same plane that do not intersect.

Parallelogram: a quadrilateral whose opposite sides are parallel.

Parentheses: the symbols ( ). Parentheses indicate the numbers that are to be combined first.

Pentagon: a polygon with five sides.

Percent: a ratio that compares an amount to 100.

6 out of 25 is $\frac{6}{25}$, or $\frac{24}{100}$, or 24%.

Perimeter: the distance around a closed figure.

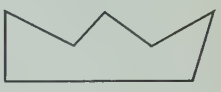
Perpendicular lines: two lines that intersect to form right angles.

Place value: the value given to the place in which a digit appears in a numeral. In 735, 7 is in the hundreds place, 3 is in the tens place, and 5 is in the ones place.

Plane: a flat surface whose length and width have no limits.

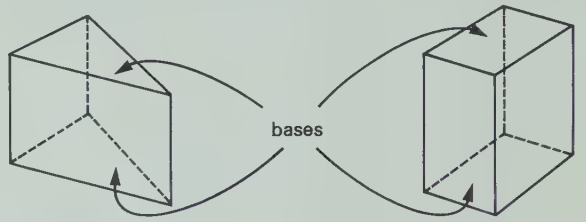
Point: a point marks a position. It has no size and is usually represented by a dot.

Polygon: a closed figure made up of line segments.



Prime number: a whole number, greater than 1, that has only two factors, itself and 1.

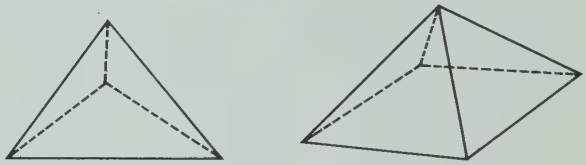
Prism: a three-dimensional figure with two congruent parallel faces called *bases*.



triangular prism rectangular prism

Product: *see* Multiplication.

Pyramid: a three-dimensional figure whose base is a polygon and whose other faces are triangles.



triangular pyramid square pyramid

Quadrilateral: a polygon with four sides.

Quotient: *see* Division.

Radius: a line segment whose end points are the centre of a circle and a point on the circle.

Rate: a comparison of the change in one thing with the change in another. $89.50 a week, three pills a day.

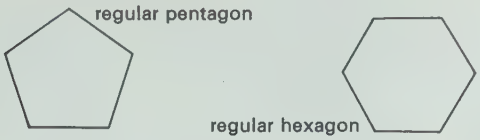
Ratio: a pair of numbers used to make a comparison. The ratio of 4 to 5 is written 4:5 or $\frac{4}{5}$.

Ray: a part of a line. It has one end point and continues without end in one direction.

Reciprocal: two numbers are reciprocals if their product is 1. 4 and $\frac{1}{4}$ are reciprocals. $\frac{3}{2}$ and $\frac{2}{3}$ are also reciprocals.

Rectangle: a parallelogram with four right angles.

Regular polygon: a polygon that has all sides of equal length and all angles of equal measure.



Remainder: *see* Division.

Rhombus: a parallelogram with four sides of equal length.

Right angle: an angle whose measure is 90°.

Roman numerals: seven capital letters used alone and combined in certain ways to represent numbers. I = 1, V = 5, X = 10, L = 50, C = 100, D = 500, M = 1000.

Rotational (turn) symmetry: a shape that fits onto itself after a turn less than a full turn has rotational symmetry.

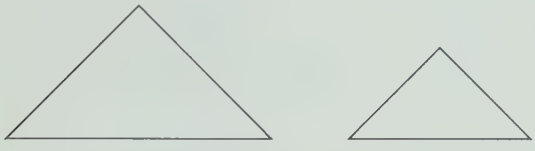
Rounded number: a number expressed to the nearest ten, hundred, thousand, and so on. 348 rounded to the nearest ten is 350.

Scale: the ratio of the distance between two points on a map or on a diagram to the distance between the actual locations.

Scalene triangle: a triangle with its three sides of different lengths.

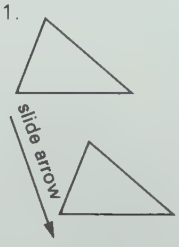
Side: a line segment forming a polygon.

Similar figures: figures that have the same shape but not always the same size.



Simplest-form ratio: a ratio using whole numbers that have no common factor greater than 1.

Slide: describes a motion that matches points in two congruent shapes like this.



Slide arrow: an arrow that shows the distance and direction of a slide.

Slide image: when each point of a shape is the same distance from the matching point of its congruent image, the image is a slide image.

Solid: a three-dimensional figure.

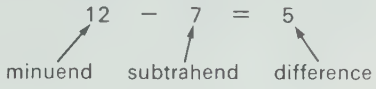
Sphere: a three-dimensional figure that looks like this.

Square: a rectangle with its four sides of equal length.

Standard form: the form of a numeral with each digit having a place value, in multiples of 10, according to its position in relation to the other digits. 7856 is the standard form for 50 + 800 + 6 + 7000.

Straight angle: an angle whose measure is 180°.

Subtraction: an operation on two numbers that tells how much greater one number is than the other.



Subtrahend: *see* Subtraction.

Sum: *see* Addition.

Symmetric shape: a shape that can be folded in half so that the two parts match.

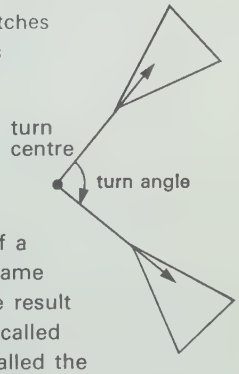
Tessellation: a tiling pattern made with one shape.

Tiling: the process of using congruent shapes to cover a region completely.

Trapezoid (trapezium): a quadrilateral with one pair of parallel sides.

Triangle: a polygon with three sides.

Turn: describes a motion that matches points in two congruent shapes like this.



Turn angle: *see* Turn image.

Turn centre: *see* Turn image.

Turn image: when each point of a shape is turned through the same angle about a given point, the result is a turn image. The angle is called the *turn angle.* The point is called the *turn centre.*

Vertex: the common end point of the two rays of an angle, two sides of a polygon, or three or more edges of a solid.

Volume: the amount of space occupied by an object.

Symbols

mm	millimetre	t	tonne
cm	centimetre	°C	degree Celsius
dm	decimetre	s	second
m	metre	min	minute
km	kilometre	h	hour
cm^2	square centimetre	d	day
m^2	square metre	+	plus
km^2	square kilometre	−	minus
cm^3	cubic centimetre	×	times
dm^3	cubic decimetre	÷	divided by
m^3	cubic metre	=	is equal to, equals
mL	millilitre	≠	is not equal to
L	litre	>	is greater than
g	gram	<	is less than
dag	decagram	.	decimal point
hg	hectogram	$	dollars
kg	kilogram	¢	cents

Table of Related Units

10 mm = 1 cm	(10 millimetres = 1 centimetre)
10 cm = 1 dm	(10 centimetres = 1 decimetre)
10 dm = 1 m	(10 decimetres = 1 metre)
100 cm = 1 m	(100 centimetres = 1 metre)
1000 mm = 1 m	(1000 millimetres = 1 metre)
1000 m = 1 km	(1000 metres = 1 kilometre)
1000 mL = 1 L	(1000 millilitres = 1 litre)
10 g = 1 dag	(10 grams = 1 decagram)
1000 g = 1 kg	(1000 grams = 1 kilogram)
1000 kg = 1 t	(1000 kilograms = 1 tonne)
100¢ = $1.00	(100 cents = 1 dollar)
60 s = 1 min	(60 seconds = 1 minute)
60 min = 1 h	(60 minutes = 1 hour)
24 h = 1 d	(24 hours = 1 day)
7 d = 1 week	(7 days = 1 week)
365 d = 1 year	(365 days = 1 year)

52 weeks = 1 year

12 months = 1 year

100 years = 1 century

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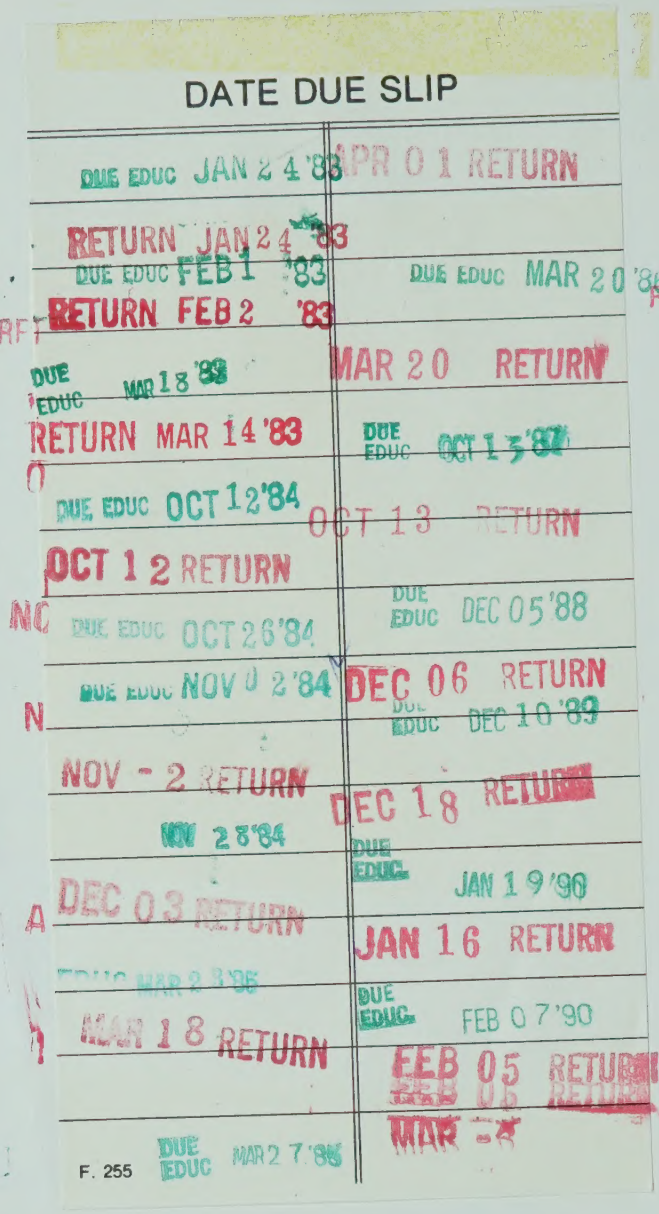
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